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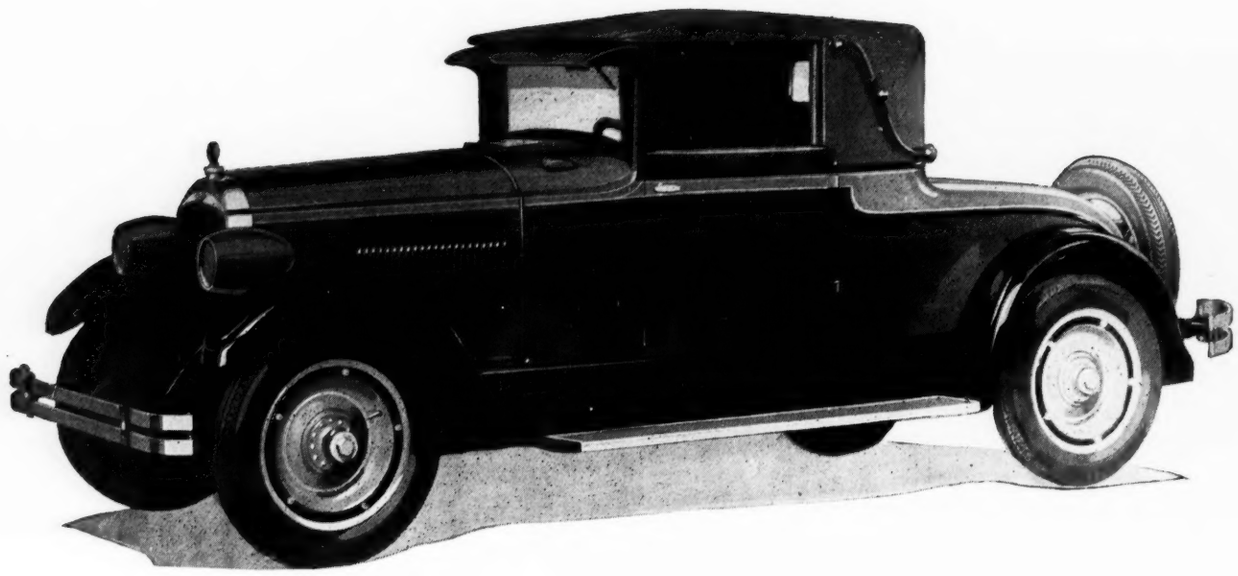

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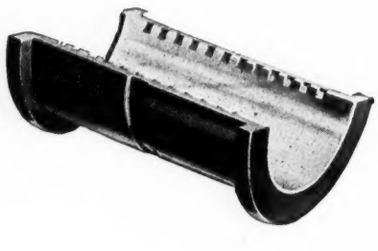

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AUTOMOTIVE INDUSTRIES

VOLUME 55 *Philadelphia, Thursday, September 23, 1926* NUMBER 13

Oil Board's Report Doesn't Justify Fuel Shortage *Scare*

Experts see no reason for alarm over future gasoline supply. Competitive drilling and waste of natural gas chief evils. Government control held detrimental.

By Frank Savage

THE automotive industry as a whole refuses to get excited over the scare-heads used in a section of the daily press in connection with summaries of the recently issued preliminary report of the Federal Oil Conservation Board. Practically all agree that a careful analysis of the report fails to justify such alarmist headlines as "Only Six Years' Supply of Oil Left," "Face Fuel Shortage in Six Years," etc. It is held, moreover, that the report does not support the theory that compulsory application of the "unit pool operation" plan is the only guarantee of a continued petroleum supply, or that there is any real danger that this country will ever lack sufficient fuel for its internal combustion engines.

There is practical unanimity of opinion, especially among leaders in the oil industry, that Government interference of any kind with the delicate economic balance which has been established in that industry would almost certainly result detrimentally to the oil business, the automotive industry and the public.

The consensus of opinion among the executives interviewed on the subject seemed to be that no individual or group of individuals can have a sufficient grasp of the whole situation to be allowed to interfere with its natural development.

Briefly, the Federal Oil Conservation Board's report, which is preliminary to two important additional reports, presents a summary of the conclusions reached as the result of extensive investigations by Government scientists and data contributed by authorities in the industry. There are two well defined lines of reasoning reflected in the report. One of these holds that, since there always has been an adequate supply regardless of the rapidly increasing rate of consumption, ways and means always will be found to meet the demand. The other is that every natural resource obviously is limited and rigid conservation is essential.

ONE of the chief factors in the success of the automobile in the United States has been cheap gasoline. This year, with more than 20 million motor vehicles in operation, gasoline is cheaper than it was five years ago, or ten years ago.

It is estimated that our total gasoline consumption this year will reach 10 billion gallons—more than four times what it was 10 years ago. Next year, if the present rate of increase in maintained, it will be from 12 to 13 billion, in 1928 possibly 15 billion, and so on.

At this rate of consumption how long will our supplies last? Volumes have been written on this question and most automobile men are familiar with the answers advanced to date, but interest will always center in the subject owing to its importance to the motor car industry. Thus the recent report of the Federal Oil Conservation Board is attracting considerable attention at this time. In this article the report is discussed from the automotive point of view.

The report points out that the total present reserves in pumping and flowing wells in the proven sands has been estimated at about 4½ billion barrels, which is theoretically but six years' supply, though, of course, it cannot be extracted so quickly. It is upon this paragraph that many of the newspapers seized for the leads of their stories and their headlines. Any criticism of the report, or of the newspaper treatment of it, has been directed at the emphasis made on this statement. These criticisms point out that essential elements in the development of petroleum supplies always have been continued exploration for new fields, improvement in methods of extraction and conservation by retention of the native gas content in the sands, and by improved storage facilities, etc. Experts point out also that the great progress made

in refining processes, cracking and also in the increased efficiency of internal combustion engines have such a tremendous bearing on how long the natural petroleum deposits now available will last that it is absurd to make any guesses as to when they would be exhausted, even though no new fields were developed. These points are brought out in the Government report but in a number of instances were not revealed in their proper perspective in brief published summaries.

Control is Advocated

After reviewing in great detail the production records over a period of years, the possibility and probability of the discovery of new sources of supply and probable consumption, the general tone of the report seems to imply that rigid conservation is necessary, that some form of control, either Federal or State, should be exercised and that if it is impossible to obtain voluntary cooperation among oil operators in the fields, compulsory coordination is called for.

The oil industry generally, judging from the opinions of a number of executives interviewed, does not agree with this conclusion, although it does not by any means disagree with the conviction of the board that reasonable conservation is morally and economically desirable. The general disposition is against Government interference of any kind and is based on the impression that with so many variables and unknown factors and the interdependence of these factors it is extremely unlikely that the Government could improve the situation by arbitrary legislation. There is common agreement that the problem of our future fuel supply is almost exclusively one of economics.

One expert, well known in the industry, pointed out that there are so many alternatives available that any appreciable increase in the price of gasoline caused by a reduction in the supply of petroleum would almost certainly cause a reaction which would bring the price back quickly and surely to its previous level and that it is not inconceivable that the price would be reduced. He explained this apparently paradoxical statement thus: If gasoline should go to 30 cents the increase would certainly be attended by an appreciation of the value of shares in oil companies on the stock market. This, in turn, would attract large capital from other industries and the resultant impetus to exploration, accelerated scientific progress in extraction and the development of synthetic fuels would more than meet the situation. This expert said that he would feel much safer in wagering that an increase of a few cents in the price of gasoline would result in a tremendous overproduction than that a shortage can ever exist in this country.

Use of Compressed Air

"On my recommendation," this authority asserted, "several million dollars has been invested in the application of compressed air as a substitute for natural gas pressure, which had been wasted in the too rapid development of flowing wells. The experiments warrant the commercial use of this method at present. 'Mining,' which at present consists merely of sinking a shaft, permitting the oil stands to drain into it and pumping out the oil, would be capable of much wider application in the event of a slight increase in the value of crude. With crude just a little bit higher the oil sands could be extracted from the earth and the last drop of petroleum extracted at the surface by processes which are now available. The widespread use of this method would result in a tremendous increase in the percentage of oil recovered from a given oil bearing area."

While the Government report has led to much discussion, both sides—for there are two well-defined schools of thought on the subject of oil conservation—concede the document to be a tempered and well considered review of the entire situation. Any disagreement which has followed its publication is due to a difference of opinion as to its interpretation.

In the American Petroleum Institute a minority faction, led by Henry L. Doherty, has aggressively advocated an extreme conservation program. Mr. Doherty and his supporters are exponents of the "unit pool operation" theory. By this is meant the compulsory cooperation of the large numbers of owners into whose hands an oil field usually falls. In this country it has been common practice for promoters to divide oil properties into a large number of small plots. Highly competitive drilling, involving the sinking of many wells and the erection of what may be regarded as excessive storage facilities then begins. This is a natural condition growing out of the subdivision of the properties, because each operator realizes the necessity of sinking a well as soon as his competitor does, under penalty of having all the oil drained out of his property. This brings an enormous quantity of oil to the surface, with the possibility of producing an excessive supply, and with an attendant glutting of the market and a possible decline in price.

As the Government report points out, voluntary cooperative operation obviates these results. By getting together, the yield may be controlled, the wells spaced for most economical recovery of a maximum amount of oil, and much less extensive storage facilities are required.

Exhaustion of Gas Pressure

Another result of too rapid development of a field is the exhaustion of the natural gas pressure. In most instances of highly competitive drilling, much natural gas escapes. This represents a great loss, not only in the value of the gas itself but in the subsequent necessity of pumping the oil instead of permitting it to flow out of the gushers which are characteristic of new fields.

Those who take issue with Mr. Doherty and his supporters agree that the conservation of this gas pressure and a reasonable control of the supply are desirable and profitable. They disagree, however, in Mr. Doherty's contention that such cooperation can be made compulsory by legislation. They maintain that any such compulsion would be an infringement of fundamental property rights of the individuals or groups involved, and, further, that the formation of a half dozen large companies—for six or seven big producing fields contain the "balance of power" in the oil industry—would be likely to result in a Government-endorsed monopoly which could control prices to suit itself.

One expert pointed out that the big oil producing companies at present are spending comparatively niggardly amounts in research work, looking to the development of improved methods for the recovery and refining of petroleum. If one of these companies found itself facing a shortage it could well afford to dump millions per year, instead of a possible $100,000, into accelerating these processes.

The point has been well taken also that there are vast sources of petroleum in every latitude and longitude on the face of the earth and at various depths. Wherever sedimentary rocks exist there is a possibility of oil. There are also vast untapped resources in shale deposits of this country, which most certainly will be utilized whenever the economic situation warrants it.

Many of the problems involved in petroleum production in this country are absent elsewhere. For example, there

is none of the "wildcatting" in South America, and in other undeveloped regions, that exists in the United States. Oil exploration projects in South America require adequate financing and are undertaken only by financially responsible individuals or firms. The "shoestring" method by which the operator gets hold of a large tract of land and then sells off leases to get enough money to sink his own well does not apply in these localities. The parcels of land, therefore, are much larger, and every conceivable means of conservation can be and is employed. It is virtually impossible for a small company to operate under these conditions. There are no readily available pipe lines into which the small operator may pour his production, while the dearth of railroads and other means of transportation offer insurmountable barriers.

While the Government report points out the undesirability of dependence on foreign sources for essential commodities, pointing to the recent sad experience of the tire industry when the supply of crude rubber in the hands of the British presented a serious problem, it is a fact that Americans have been exceedingly aggressive in the development of foreign oil sources.

While it is conceded that purely synthetic motor fuels are hardly to be depended upon at present to supply any considerable percentage of the market's requirements, experts point out that these processes are already commercially practicable in Germany and that, given time for the growth of the necessary plants and equipment, they may be counted upon to become a considerable factor. Contrary to the general impression, synthetic methods of manufacturing gasoline have been known for many years. It is entirely a question of economics as to when they may become a real market factor.

By the cranking process the crude petroleum after the natural gasoline has been distilled from it, is broken down. It is possible also to manufacture gasoline from refined kerosene by the same process, although the residue in this instance is less valuable, and since there is still a considerable market for kerosene and an adequate and more accessible source of gasoline, this method has not yet been employed on as large a scale as it could be if it were necessary.

The Federal Board's report states, along this line, that "at the present moment probably 64 per cent of our gasoline comes from straight distillation of crude oil, 31 per cent comes from cracking and five per cent from natural gas gasoline. It seems theoretically possible to crack 80 per cent of the oil now being used as fuel and for heating purposes—if the gasoline were required."

The report continues: "The division of crude, as between the different kinds of oil products, is purely an economic question. There is already a tendency to displace heating oils by coal, and at a sufficiently higher demand for gasoline the fuel oils can be largely converted into supplies for internal combustion engines. The discoveries in methods of cracking oil are of fundamental importance in considering the future of our essential oil supplies. And this conversion in itself comprises a potential of assured gasoline supplies."

In conclusion, almost every authority interviewed on the report pointed to the strides which have been and are being made toward increasing the efficiency of the internal combustion engine. Increased compression, made possible by the reduction in cylinder dimensions, complete machining and the generally more scientific design of combustion in chambers, has effected a saving in the fuel consumption which counterbalances a considerable percentage of the waste due to our prevailing high speed gasoline production methods.

There is very little alarm in well informed circles, either in the petroleum or automotive industries, that there will ever be either a shortage of gasoline or a prohibitive price.

All-Pyroxylin Finish is Demonstrated

A NUMBER of automotive press representatives were entertained Wednesday, Sept. 15, at the Kearny, N. J., plant of Valentine & Co., with a demonstration of Nitro-Valspar application to an automobile body and by several short talks by Valentine representatives.

Part of a body had been cleaned and upon the arrival of the party this was given a final rub-down with solvent solution and the primer coat sprayed on. In preparing the body for the demonstration several deep scratches had been made in the bare metal in order to show the filling properties of the gunglaze—the surfacer element of the nitro-valspar all-pyroxylin system.

The pyroxylin primer was allowed to dry for about ten minutes in order that all the solvent might be evaporated and so avoid cracks, sags or bridges. Then the first coat of gunglaze was sprayed on, followed by a second coat in about ten minutes.

One valuable point brought out was, that although absolute cleanliness is essential to a successful finish when using nitro-cellulose under-coats, their use makes detection of grease spots easy. Wherever there is grease left on the metal the under-coats do not dry and show up vividly as a lustrous spot against the otherwise dull finish.

A grease spot is quickly removed by rubbing with a cloth dampened in solvent and then the spot can be recovered by means of a touch-up spray gun or the regular spray, and given the same characteristics as the rest of the surface.

After about an hour of air drying the body was water sanded. At the finish of this operation it was found that despite the fact that only two surfacer coats had been applied there remained no visible trace of the very deep scratches which had been left in the metal.

Within two or three hours, after the moisture left from the water sanding had entirely disappeared, two coats of nitro-valspar enamel were sprayed on in quick succession, a third spot coat was applied over certain parts of the surface and the body was polished to a lustrous finish.

During the day talks were given by L. V. Pulsifer, vice-president and chief chemist on the development and advantages of an all-lacquer system such as nitro-valspar; by C. A. Greene, general superintendent and color expert, on the sources and uses of pigments employed; by L. Clayton Hill, Detroit representative on nitro-valspar sales service, and by Russell Rogers, application expert, on the practical application of nitro-valspar in production and refinishing shops.

The remainder of the day was filled with a tour of the plant which included inspection and demonstrations of the many service, physical and chemical tests given to nitro-valspar products to determine their adherence to the high standards set. Possibly the most spectacular of these —and one developed to set at rest the opinion sometimes heard that pyroxylin finishes will not stand sudden temperature changes—was the subjection of a nitro-valsparred panel to an instantaneous temperature drop of some 350 deg. Fahr. without producing any visible ill effects.

Oakland Puts *Dealer Education Work* on Systematic Basis

Special organization is functioning along practical lines to put over modern merchandising ideas and give dealers a better grasp of all phases of business.

By Norman G. Shidle

DEALER education activities and sales promotion in general have been common among automotive manufacturers for many years, but the operation of work of this kind along systematic and thoroughly organized lines is a development of the last half-decade. A good proportion of the sales development effort of automobile factories—much of it original, sound and meritorious in itself—has had less than maximum effectiveness because it has too often been sporadic, uneven in character and far too general.

Gradually, the usefulness of organization and system in the handling of such development has come to be realized and current activities furnish more than one illustration of sound and systematic functioning along these lines. But even today, there is a wide difference among the various car and truck manufacturers in type of organization, character of material and means of obtaining results in sale promotion. An excellent example of a very complete sales development department, functioning along unusually practical lines, is presented in the division carrying on this work at the Oakland Motor Car Co.

Distinctive features of the Oakland set up appear to be:

1. An unusually complete organization and an unusually clear and specific conception of objectives and methods.

2. A rather rigid adherence to a policy of giving to dealers only concrete, practical, usable material, the application of which in the actual problems of the dealer is obvious. Platitudes and golden verbiage have been pretty successfully eliminated from the material sent out by this Oakland sales development group.

3. A special staff of instructors—distinct from factory traveling men but under district managers—whose duty is to conduct a course in merchandising for dealers and dealer salesmen in the dealers' places of business.

4. The ability of the sales development department to practice successfully what it preaches, *i.e.* constructive merchandising. The factory department makes it a point to eliminate the word "must" from all of its dealer relations, thus making its work stand or fall very largely on its own ability to sell its ideas and help to the retailers.

Of the four points mentioned, probably the most important, fundamentally, is the clarity with which the program and scope of the sales development department has been outlined and the systematic and orderly fashion in which activities are carried out along each of the various lines in which it has been determined the department should function. By building its work on this sound basis, many of the pitfalls and a large part of the ineffectiveness have been avoided which sometimes have characterized less clearly defined activities of this kind in the past. It would be difficult to lay too much emphasis on the importance of this phase of installing and operating factory sales promotion plans.

The specific activities of the Oakland sales development department may be summarized as follows:

Conducting Oakland's Course of Better Merchandising with trained specialists in the field. Supplementing this by correspondence from the home office to dealers visited by sales development field instructors, throughout the year.

Special investigations of individual dealer's merchandising methods. Giving definite recommendations based on positive and negative conditions discovered.

Periodically distributing bulletins, treatises, inspirational talks, etc., to all Oakland dealers.

Preparing special campaigns for dealers where increase in community wealth is anticipated.

Searching of field representatives' daily reports in order to offer suggestions helpful to dealers in overcoming negative conditions discovered.

Helping dealers analyze their markets to determine sales possibilities and how best to stimulate sales.

Stocking prospects and salesmen's control system cabinets and special mailing lists, etc.

Assembling forms, charts, and statistics valuable to Oakland dealers.

Publishing and distributing information and procedure for moving stocks of used cars.

Cooperating with dealers in the publication of local house organs.

Offering suggestions to dealers for use in their choice and training of salesmen.

Encouraging from time to time the use by Oakland dealers of dictated and form letters as a vital phase of modern selling.

Suggesting brief and comprehensive outlines for the conduct of retail sales meetings—programs, etc.

Outlining for dealers the duties of retail sales managers and wholesale managers.

Establishing for dealers the best and latest approved methods of "salesmen's compensation."

Designing floor plans for new buildings and redesigning old buildings for use of dealers.

Instructing dealers as to the lowest cost and most effective ways of conducting their establishment.

Offering dealers help to make floor, window, and street displays more attractive to the public.

Drawing dealers' attention to the use of stunts originated in Oakland and other organizations.

Developing ways for dealers to interest fleet owners in the Oakland and Pontiac sixes.

Showing dealers how to fix and maintain quotas.

Bringing dealer, banker and manufacturer closer together.

Telling dealers in interviews and through the Oaklander "Melting Pot" of successful methods used by other Oakland dealers.

Building local good-will for the dealer, his organization and the Oakland and Pontiac lines.

This work is conducted specifically through the members of the sales development department and generally through the cooperation of the entire Oakland sales organization in the field as well as in the home office. The sales development department is a separate division of the general sales department.

To attempt to describe in detail the handling of each of the special functions would take far more space than is available. A few activities, however, appear to be of more or less outstanding importance.

The Course of Better Merchandising, for example, is one of the most practical efforts of this kind yet attempted in automotive merchandising. In handling this course, not only has care been taken to make the text books practical, brief and actually applicable to the

A piece of direct mail literature used by the Oakland sales promotion department to sell the Oakland-Pontiac merchandising program to the dealer organization

every-day problems of the retailer, but also the means of getting the course across has been studied and is being carried on according to a definite, predetermined plan.

To begin with, the text was planned to include specific information for the dealer on how to handle each of the various phases of his merchandising and business activity. It tells him, not merely that he should have an attractive show room, but also tells him how to make it attractive. It tells him how to talk to a prospect, how to give a demonstration, how to answer all of the possible objections to signing on the dotted line that the average customer is likely to think up, how to appraise his used cars, how to handle his accounting properly and how to do some twenty or thirty other things which he must do effectively if he is to be a successful automobile dealer.

Following in method of presentation closely along the lines of the "how" articles, which leading automobile dealer trade publications have been running for many years, this course adapts its material to the specific needs and requirements of the Oakland retail organization. It really tells the dealer "how" in simple specific terms and spends practically no time telling him what he ought to do and then leaving him to find out as best he may how to do it.

But having been carefully prepared, the course was not mailed broadcast to dealers and dealer salesmen in the fond hope that they would sit up late at night devouring its valuable contents. An inspirational letter urging upon the retailers the merit of the course was not relied upon to get it used.

The course is being presented to dealers by eight special instructors who operate as members of the sales promotion department. The first job, of course, was to instruct the instructors. This was the function of the chief instructor. That task having been accomplished, the instructed instructors were sent into the field to give the course to the dealers.

Then the objectives and uses of the course were outlined clearly to every district manager and every field representative, so that the entire personnel of the factory contacting with dealers would be able to help in putting over the idea.

Even with this careful preparation of ground work and sales pressure behind the course, it is recognized that some dealers will get far more out of it than others. But the factory is making certain that it has done everything in its power to make the course of maximum value to any given retail organization.

Then there is the used car sales manual and the used car selling assistance which now is being given to Oakland dealers by this department. The used car manual follows the same practical lines as does the merchandising course, and makes some very definite recommendation as regards used car merchandising which will be described in detail in a later article.

Talks are being written each week for dealer sales managers to present at their weekly salesmen's meeting. The dealer sales manager does just as he likes with these talks, either reading them verbatim, putting them into

his own words, using them as a topical basis for a discussion or disregarding them entirely if he sees fit. The talks have been quite favorably received, however, and are being utilized by a large majority of dealer sales managers in one way or another. They tend to raise the general level of discussions at these sessions and to insure the presentation of at least one constructive selling idea at each one.

Special Service Rendered

In specific instances as well as in these general ways, the sales development department serves dealers in connection with their merchandising problems. Special campaigns designed to reach various groups of local prospects where business conditions warrant intensive work are outlined by the department to interested dealers. Recently, for example, a large eastern manufacturer announced a bonus of $2,750,000 to his employees. An aggressive sales development campaign was outlined for the local Oakland dealer which enabled him to exchange Oakland automobiles for a part of this money.

Dealers bring to the department individual sales or business problems of various kinds and the department is organized to handle such requests promptly and in a practical, helpful manner.

Direct by mail campaigns to dealers are being used to let the dealers know specifically what services the sales development department is equipped to perform and to encourage and enable them to make effective use of its facilities. The folders outlining these services are being sent not only to Oakland dealers for their information, but also to lists of other car dealers as a part of the Oakland campaign to interest more automotive retailers in handling the Oakland line. A part of a recent direct mail piece is illustrated in an accompanying cut.

So, throughout the whole range of functions delegated to this Oakland sales development department, particular emphasis seems to have been placed upon operating according to an orderly, predetermined plan; keep the material presented thoroughly specific, simple and practical and getting across the idea through selling effort rather than through methods of compulsion.

Unusal Features in New Bus

THE Liberty Motor Vehicle Co., recently organized to produce a gas-electric motorbus, has leased for a short period the north wing of the plant of the Cleveland Automatic Machine Co., Cleveland, Ohio, and is producing its first bus for exhibition at the American Electric Railway Association show at Cleveland beginning Oct. 4.

The new bus is being built around a transmission invented by E. M. Fraser, of Yonkers, N. Y. The assembly is rather an electric control than a transmission and was originally intended for passenger car use, to reduce operating expense and add to the flexibility.

Among the unusual features is the location of engine, radiator and control on a sub frame secured to the main frame. The power unit can be slid out on skids in a few minutes when adjustments or inspections are necessary. The radiator arrangements also are unusual. The core is removed by dropping forward the front of the radiator and taking out the entire core by the removal of four screws. Removal of the power unit does not involve removal of wiring, as all electric contacts are automatic. It is only necessary to disconnect the muffler pipe, gas and oil lines, and these are so designed as to make such disconnection simple.

The Liberty bus will have no flywheel, starting motor or air brakes. Braking is done entirely with the engine and the construction is such that the full power of the engine may be used for this purpose.

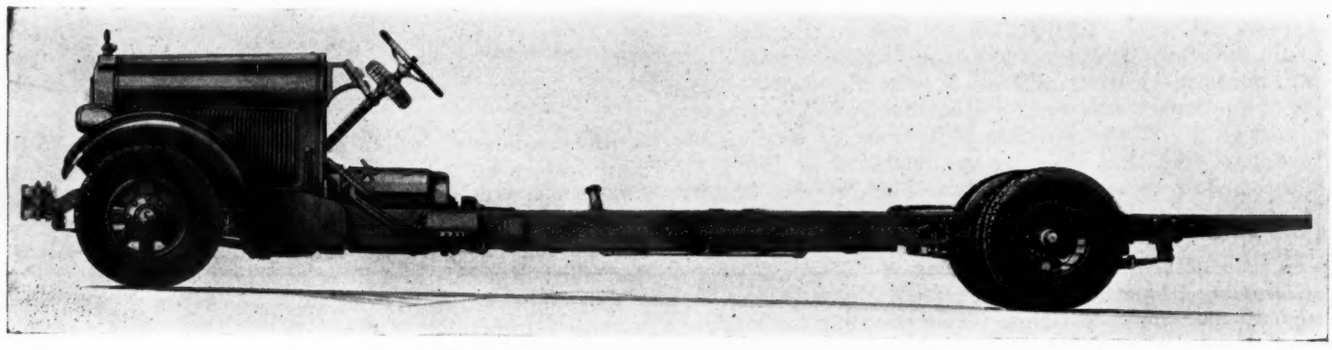
Buttons for the control of the bus are located on a disk directly beneath the spider of the steering wheel, which disk also serves as instrument board.

Elmer G. Griese is actively in charge of production of the first Liberty bus and is vice-president of the company. Frank C. Schmidt, president of the Liberty Highway Transportation Co., of Toledo, is president. Russell Kinkaid is secretary and treasurer.

These men first formed the Liberty Development Co. to complete the development of the design, and then the present company. A factory is being sought, and present indications are that the enterprise will locate at Toledo.

A THEORETICAL investigation of heat flow in explosion engines has been made by Dr. Eng. August Herzfeld, who used the same as the basis for a thesis for the degree of Doctor of Engineering from the Technical College of Munich. This thesis, with certain corrections and additions, has been printed in pamphlet form and a copy has been sent us for review by the publisher, Verlagsbuchhandlung Julius Springer, Berlin.

Dr. Herzfeld's treatment of the subject is based on the boundary layer theory, which has given such excellent results in the hands of Prandtl and others in connection with problems in aerodynamics. According to the author, the problem of heat flow in explosion engines has become particularly acute since the adoption of high compression ratios a few years ago. With the reduction in the compression chamber volume it became necessary to carry off heat at a more rapid rate, and it is therefore of the highest importance to be able to determine the amount of heat to be disposed of when designing the engine. The equations obtained are applied to various engines of Continental design for which all of the necessary data were at hand. At the end of the pamphlet the most important formulas derived are summarized.



Bus chassis of Liberty Motor Vehicle Co.

Just Among Ourselves

Dealer Relations Problem Grows

THE practice of holding dealer and distributor conventions in the late summer and early fall has become quite common among the passenger car makers. More and more the dinners and gatherings held during the National Shows are getting to be little more than get-togethers, although some companies still adhere to the policy of making their show gatherings real business as well as pleasure events. Sectional in place of national meetings also are becoming more common as time goes on and dealer organizations increase in size. The whole question of factory relations with dealers constantly becomes more complex. During the same period in which the number of retailers has been growing, the keenness of competition has increased and the necessity for trying in specific ways to build individual dealers into better merchants has grown also. Consequently, the problem of dealer relationships from the manufacturers' standpoint seems to be increasing, not in mathematical, but in geometrical progression.

* * *

Too Few Horses, Too Much Hay

THE indirect effects of any given mechanical development are difficult to foresee even when the application of the development is limited. In the case of so influential a product as the automobile, we get new claims about the ramifications of its influence every day, despite the fact that it has been a powerful economic factor in American life for nearly two decades. Now a bulletin from the National Lumber Manufacturers' Association quotes a report of the Department of Agriculture as blaming the installation of power farming equipment for one of the important decreases in the farmers' market. Here's how the argument runs: "Domestic animals are supported by agriculture as much as humans. In 1920 it took the crops on 90,000,000 acres to feed them. Automotive vehicles and mechanical power eat no hay, oats or corn. Farm tractor, truck, and machine displaced within five years 3,500,000 horses and mules, so that the farmers find themselves without the customary domestic animal market for near 10,000,000 acres of land. Result, exportable surpluses of a number of products, with the further result that American agriculture remains on a world market and free-trade basis, whereas it was confidently expected that the growth of population would have given agriculture a cinch on the home market behind the high tariffs on farm products. The human population grew but allowance was not made for the effects of animal depopulation." Poor old motor vehicle! There are few troubles of the world for which it has not been blamed!

* * *

Conventions Costly But Money Well Spent

BUT the most successful selling organizations have kept up with the situation pretty well. Sales conventions tend to become more business-like and fuller of practical activity every year. A modern sales convention for a large organization may easily cost in excess of $200,000, but probably less money is wastefully spent than ever before.

* * *

Buying Habits of Automobile Owners

WE'VE heard a lot of sales managers say that the best salesmen they have are the cars of their particular make already in the users' hands. The feeling has been that a satisfied owner is very likely to become a repeat buyer; that cars already running help materially to assure a considerable replacement market for the particular vehicle. This general idea is borne out by a set of interesting data recently developed by the Cleveland Automobile Manufacturers' and Dealers' Association which shows for the first six months of 1926 the license transfers in Cleveland during that period. Since the license is kept by the owner and is changed from one car to another in Ohio, the figures show the make of car sold by the owner and the make bought by him subsequently. Thus it becomes possible to see how great a proportion of old Buick owners, for example, got new Buicks, and so on for all other makes.

* * *

Large Percentage of Repeat Orders

THE sales value of having cars in owners hands is indicated by the fact that out of the 24 makes on which data are supplied, in the case of 13 makes more than 40 per cent of the owners bought the same car again. This percentage of resale to old owners varied in this territory for the period mentioned from a high of 71 per cent for Chrysler to a low of 11.3 for one of the smaller production cars in the $1000 price class. The area and the period covered by the figures are not large enough to make them of general quantitative significance, but they are sufficiently broad to help substantiate the idea that a good car is its own best salesman, and that—*other things being equal*—the average owner tends to buy another car of the make which he already has owned.—N. G. S.

A Study *of a* Stock Engine With *an* Indicator

Characteristic properties of the working cycle are discussed on basis of actual indicator diagrams and the influence of valve timing is experimentally demonstrated.

By Scipione R. Treves, D. Sc., M. E.

ELIMINATING the element of uncertainty inherent in purely theoretical deductions and also the laborious trials and errors of empiricism, recent development of testing methods and instruments opened up new possibilities for a systematic analysis of the influence of the manifold factors which enter into the design and operation of a high-speed internal-combustion engine, thus indicating ways for the accurate control and improvement of its performance.

The basis for most engine calculations is the indicator card, but unfortunately, until recently, such cards could not be taken from high-speed internal-combustion engines. This problem has been seriously dealt with in recent years, and these endeavors led to useful solutions. (1).

Particular importance attaches to the indicating of stock types, which have already stood well the test of practical experience. This permits of collecting experimental data which may serve as a basis for future designs and as a contribution to the further improvement of the engines.

In the following it is intended to describe a series of tests conducted on a stock engine and to outline the valuation of the results obtained. In view of the novelty of the testing methods employed, it is thought that their description will prove of interest.

The engine tested is known as Fiat Type 101, which is extensively used as the powerplant for Fiat Models 501 and 502 passenger car and for the 502 F. truck. It is a four-cylinder four-stroke type of orthodox design, with L-head cylinders and detachable head. The numerical data of the engine are as follows:

Bore (b) = 65 mm. (2.55 in.)

Stroke (s) = 110 mm. (4.35 in.)

giving a piston displacement of

$$V_h = 365 \text{ cu. cm.}$$

for each cylinder, and corresponding to a total displacement of 1.46 liters or 89 cu. in.

The compression volume is

$$V_c = 96 \text{ cu. cm.}$$

giving a compression ratio

$$\left(\rho = \frac{V_h + V_c}{V_c} = 4.8\right)$$

The valves have a diameter of

d = 27 mm. (1.06 in.)

and the tappet clearances with the engine cold are:

(1) See Automotive Industries, Feb. 7, 1924, p. 298; Auto-technik, Jan. 11, 1925, p. 15; Engineering, Feb. 27, 1925, p. 257; Motorwagen, April 20, 1925, p. 220; The Automobile Engineer, Jan., 1925, p. 9 and Sept., 1925, p. 292.

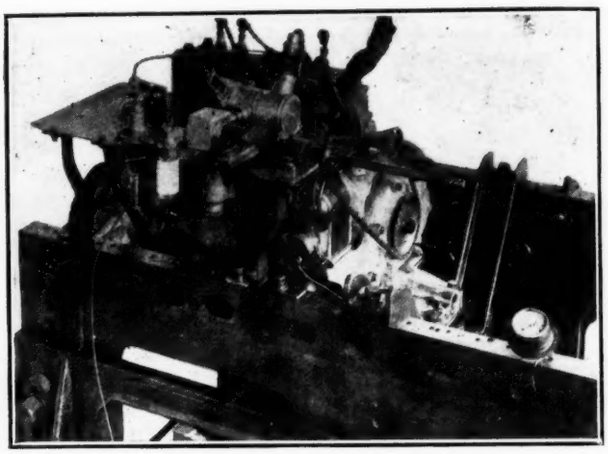


Fig. 1. De Juhasz indicator apparatus mounted on engine

For the inlet valve g_i = 0.06 mm. (0.00236 in.)

For the exhaust valve g_e = (0.08 mm. 0.00315 in.)

The timing of the valves is: Intake valve opens 5 deg. before upper dead center, closes 50 deg. after lower dead center; exhaust valve opens 40 deg. before lower dead center, closes 5 deg. after upper dead center.

A stock carburetor was employed, having a venturi throat diameter of

$$d_v = 21 \text{ mm. } (0.828 \text{ in.})$$

The ordinary speed range is from 1000 to 3000 r.p.m., although, of course, the minimum idling speed is much less, being about 200 r.p.m.

In the tests to be described, the engine was coupled to a hydraulic brake of the Heenan & Froude type and the torque exerted was measured by weights and a spring balance in the usual manner.

The indicator cards were obtained by means of a De Juhasz indicating apparatus (2) which, as is known, traces a complete diagram from a large number of cycles by means of an ordinary indicator and a positively driven valve element, the opening phase of which can be altered at will with reference to the cycles of the engine. In view of the references given above a further description of the apparatus may be omitted.

The apparatus was driven by means of a chain from the camshaft, a chain wheel being fitted to the latter at one end. The apparatus, as mounted on the engine, is clearly illustrated in Fig. 1.

Interest may attach, however, to a detail modification of the apparatus, which has for its object the exact coordination of the indicator drum movement with the position of the engine piston at the phase tested. This consists of a crank and connecting rod mechanism, which is

(2) See: The Automobile Engineer, Sept., 1925; Auto-Technik, 1923; Automotive Industries, Feb. 7, 1924.

applied to the phase altering gear of the apparatus. The length of the connecting rod can be altered. By setting the ratio

$$\left(\frac{r}{L} = \frac{\text{cranking radius}}{\text{connecting rod length}}\right)$$

in the mechanism equal to that obtaining in the engine, the movement of the drum will be exactly proportional to the displacement of the piston at the phase tested. This accessory is illustrated by the sketch Fig. 2, and is also visible in Fig. 1.

The tests had for their main object the determination of the mechanical efficiency of the engine. With the throttle fully opened, the effective output at predetermined speeds was determined by means of the brake, and at the same time an indicator diagram was taken.

Fig. 2

Owing to reasons of expediency, only one of the cylinders was indicated and in the calculations it was assumed that the load was evenly distributed between the individual cylinders. This assumption in general is not strictly correct, for owing to slight variations in the ignition or lubrication, tightness of seal, etc., the load distribution may vary within non-negligible limits. Nor can it be assumed, speaking generally, that the load distribution is always the same, each cylinder having a certain definite share in the total power output, because even this proportion is subject to change with time, it being quite conceivable that at one time one cylinder carries the greatest share of the load, and at another time another cylinder. This being the case, only the simultaneous indicating of all the cylinders can be regarded as a scientifically correct method. The liability of error arising from the above mentioned assumption is the greater, the smaller the number of cylinders indicated in proportion to the total number of cylinders.

In the present instance, however, considering the relatively small number of cylinders and the symmetrical arrangement of the inlet manifold, the probability of error is reduced. Indicating different cylinders in turn did not reveal any considerable difference between their individual performances. Besides, as a corrective measure this source of error was counteracted by taking a large number of diagrams.

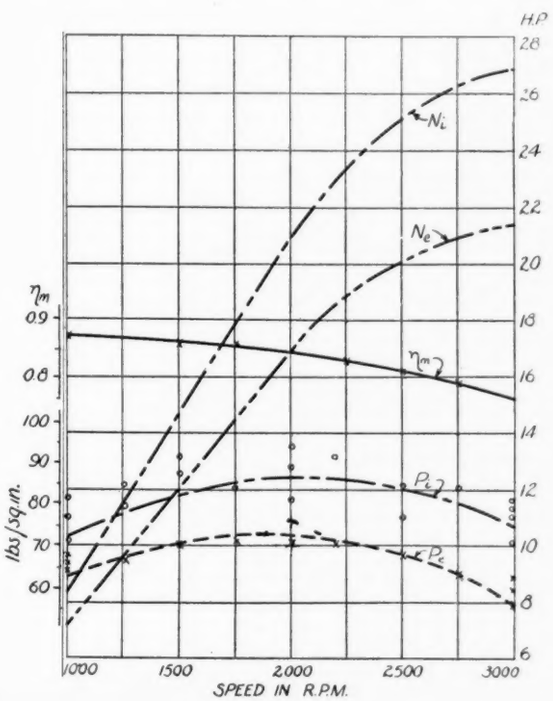


Fig. 3

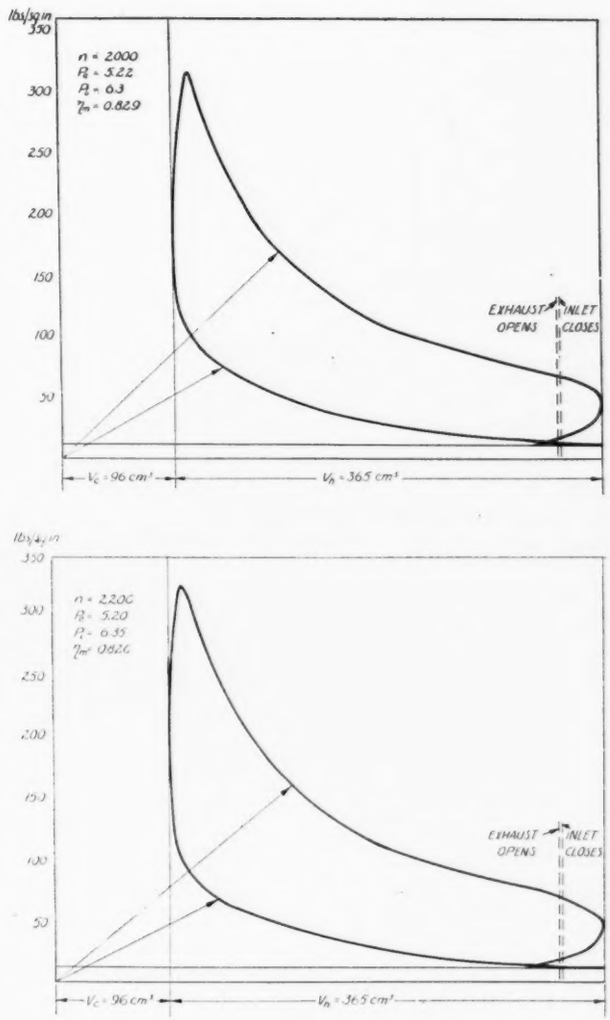


Fig. 4

In Fig. 3 the characteristic curves of the engine, as determined by the tests, are shown; N_i and N_e are the indicated and brake effective power; p_i and p_e are the indicated and brake mean effective pressures, η_m is the mechanical efficiency.

Figs. 4 and 5 show a number of cards taken with a heavy spring at 2000, 2200, 2500 and 3000 r.p.m. These cards give information on the compression pressure, which is about 100 lb. p. sq. in abs., while the explosion pressure reaches the value of 330 lb. p. sq. in abs. At increasing speeds an increasing inclination of the combustion line can be observed.

Figs. 6 and 7 show the same cards transcribed into logarithmic coordinates. This transcription offers an advantage for the study of the polytropic exponent. As is well known, a polytropic change is characterized by the equation

$$p_1 v_1^k = p_2 v_2^k$$

or in other form

$$\log \frac{p_2}{p_1} = k \log \frac{v_1}{v_2}$$

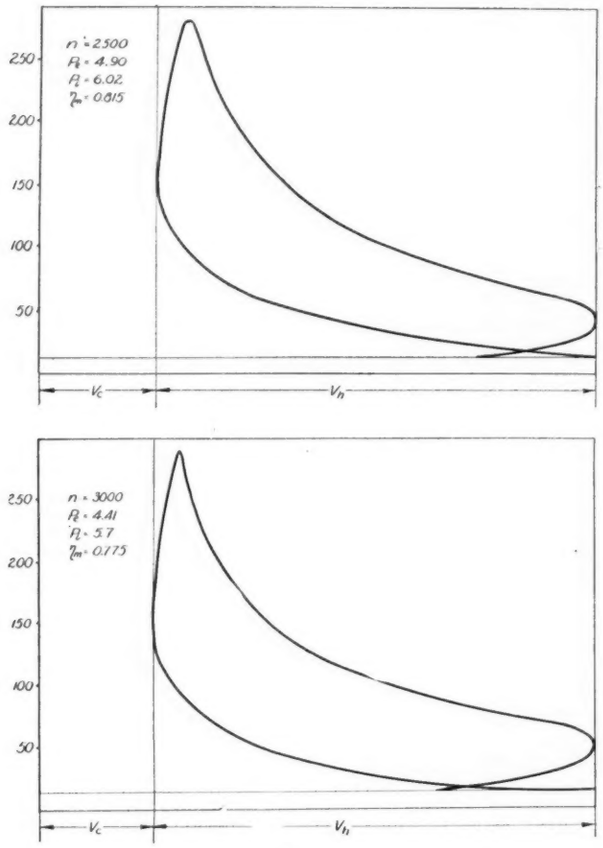


Fig. 5

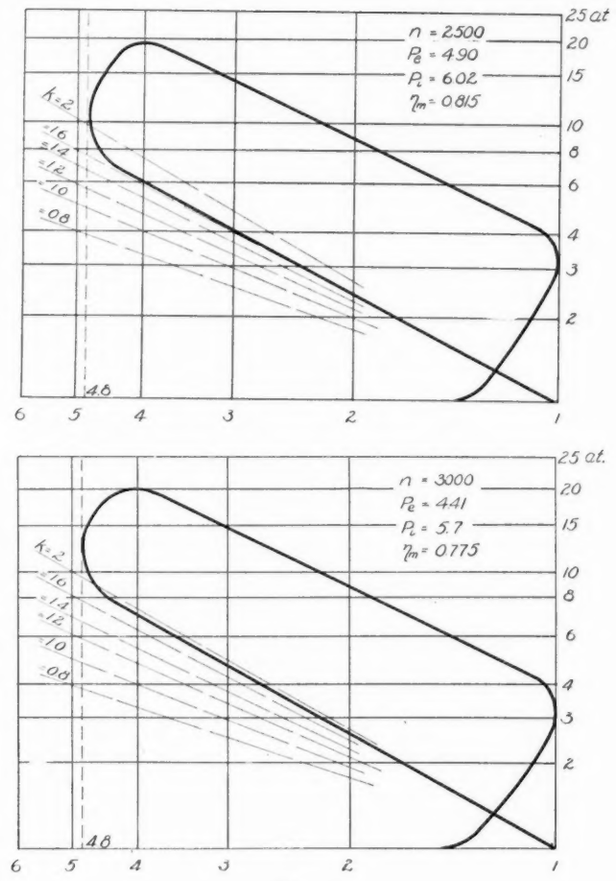


Fig. 7

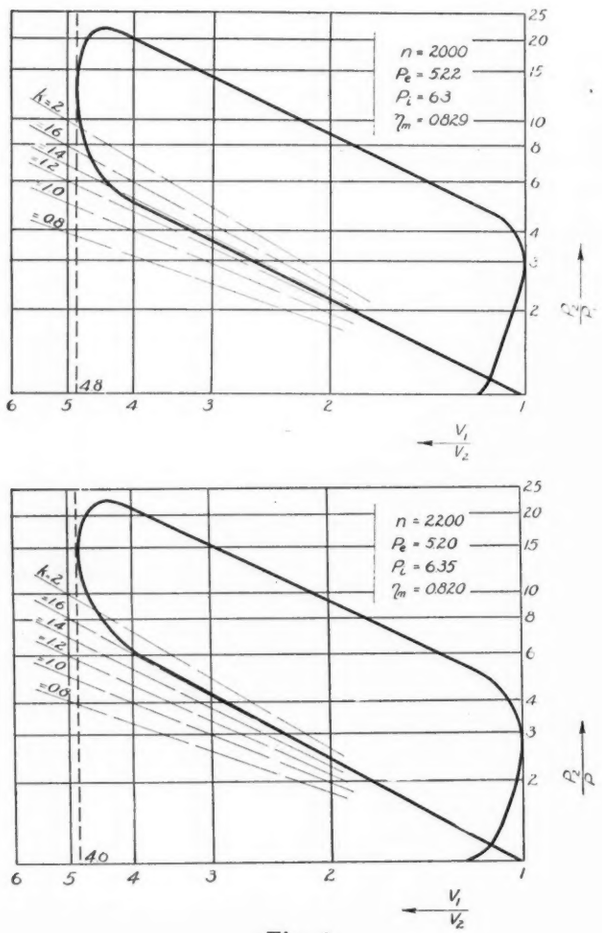


Fig. 6

p_1, p_2 being the pressures; v_1, v_2, the specific volumes of two points representative of the physical state in the p-v diagram.

Using the logarithms of the pressure and volume ratios as coordinates, the polytropic exponent appears as the slope of the curve

$$k = \frac{\log \frac{p_2}{p_1}}{\log \frac{v_1}{v_2}}$$

It is seen that in this instant the exponent for the compression line is greater than the adiabatic, which is attributable to the heat received from the cylinder walls, while the expansion line is nearly adiabatic.

For a study of the intake and exhaust phenomena, diagrams taken with a light spring are used. These are reproduced in Fig. 8. All these diagrams were taken with the throttle fully open, and they show clearly the influence of speed on the intake depression. The diagrams 1-5 were taken under normal working conditions, with a normal exhaust manifold fitted to the engine. The exhaust lines show clearly the pulsations of the exhaust pressure wave. The number of waves per stroke decreases with increase in speed, the time period being approximately the same for all speeds. The mean exhaust pressure is only very slightly above atmospheric, the back pressure being quite negligible.

Diagrams 6-10 were taken with the exhaust manifold removed, in order to study the influence of this on the exhaust back pressure. The amplitude of the waves is less and their period is also less than with the exhaust manifold on, a fact which agrees with the theory based on the laws of acoustics. The back pressure is very slight in this case also, and it is difficult to observe any difference

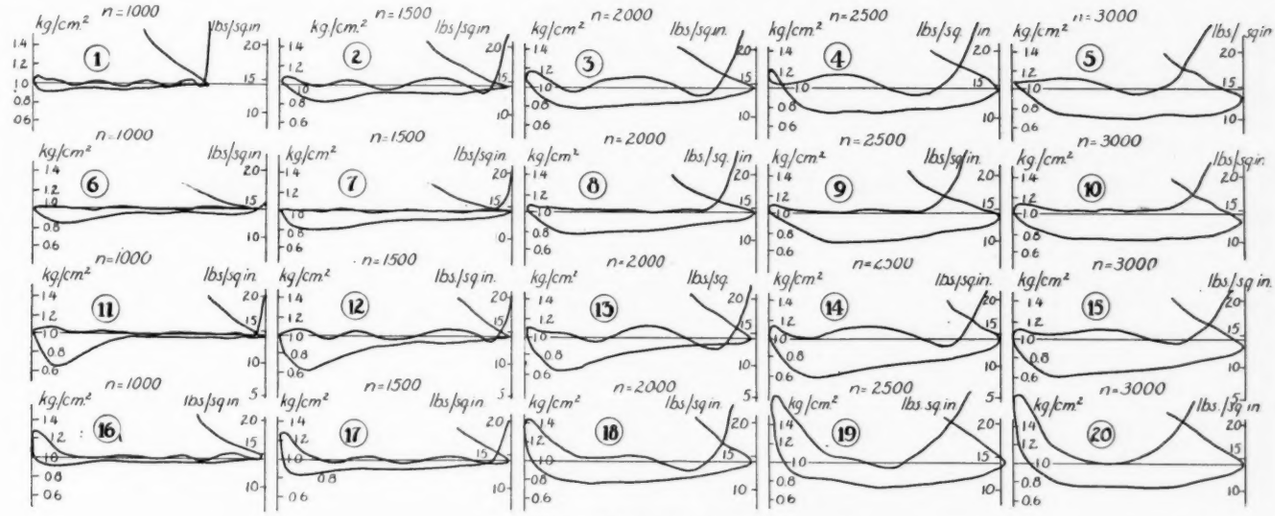


Fig. 8. Diagrams 1 to 20

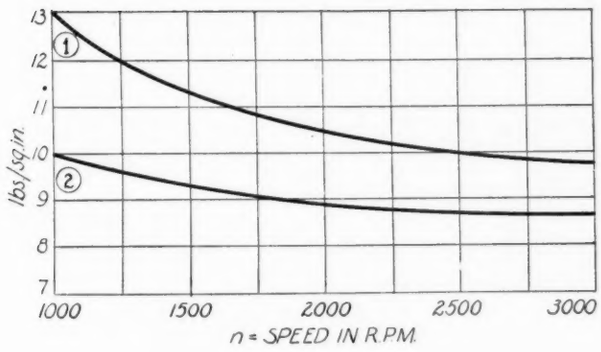


Fig. 9

in comparison with the previous case (Diagrams 1-5).

Diagrams 11-20 were taken with the exhaust manifold on. These are particularly instructive, as in this case the normal timing of the engine was intentionally altered.

Diagrams 11-15 were taken with normal exhaust, but the tappet clearance of the inlet valve was increased such an amount that the following opening and closing angle displacements resulted: Inlet valve opens 5 deg. after upper dead center and closes 40 deg. after lower dead center.

As a consequence the minimum intake pressure increased materially in comparison with the normal timing. This is shown in Fig. 9, on which line 1 shows the minimum intake pressures as a function of the engine speed in the case of normal timing, while line 2 shows that in the case of excessive tappet clearance.

Diagrams 16-20 were taken with normal intake but the tappet clearance of the exhaust valve increased to such a value that the following opening and closing angle displacements resulted: Exhaust valve opens 30 deg. before lower dead center and closes 5 deg. before upper dead center.

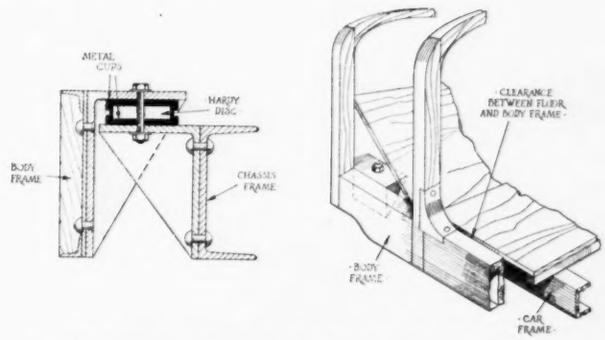
The diagrams show conclusively the increased final pressures of the exhaust gases and their subsequent expansion during the early part of the inlet stroke.

New Method of Body Suspension

A DAIMLER car has recently been fitted with a body designed by E. A. Hellstrand, an English engineer, which appears to be a distinct step forward in the search for practical light-weight bodies. In this design the body is not directly attached to the chassis frame but is mounted on an auxiliary structure which is flexibly suspended from the chassis frame at three points. By this method the body is not at all affected by distortion of the chassis so that it has neither to be rigid to increase the frame strength, as is the case with convention construction, nor so constructed as to conform with chassis movements without detriment, as is the case with designs of the Weymann type.

A normal floor is placed on the chassis frame and on this are mounted all the seating arrangements just as in Weymann type bodies. The body is built over a steel frame which is suspended from the chassis frame by means of three flexible Hardy joints—two near the front and a centrally located rear joint.

A gap of about ¼ in. is left between the floor and the body frame so that in no place does the body touch



Method of attaching body to chassis in Hellstrand design

the chassis or the floor. It is obvious, then, that, since the body carries no weight and is quite effectually insulated from any distortion transferred from the frame, it can be very lightly constructed and, in fact, the body built consists of a covering and doors—almost a tent.

MOTOR competition is being felt keenly by the South Australian Railways both in freight and passenger service, according to a report from Assistant Trade Commissioner Julian B. Foster at Melbourne. In some localities, says the dispatch, the railways have been forced to place its own motor coaches on the road.

United States Leads All Countries in Commercial Aviation

Operations have grown enormously in last few years and mileage flown here now exceeds that of principal European nations. Domestic equipment used.

By Archibald Black *

Consulting Air Transport Engineer

IT seems quite logical to date civil aviation in this country from the start of the first air mail route operating on a regular schedule. For several years after the close of the war, American civil aviation maintained its stand among that of other nations through the operations of this Air Mail Service and those of the aerial "taxi" operators. We had only a couple of scheduled passenger services, a fact often seized upon by the misinformed in an effort to prove that the United States was hopelessly behind. This conception of our backwardness has not been borne out by the figures available.

In the absence of Government regulation (now about to be put into effect) it has been necessary to depend upon private compilations of the mileage flown here. Many efforts have been made to estimate this mileage but they have carried the disadvantage of being unofficial and often of doubtful accuracy. Of the various compilations, those of the Aeronautical Chamber of Commerce have become regarded as the most authentic and probably err on the low side if at all. It is therefore interesting to note that these estimates added to the official mileage of the Air Mail Service have placed the United States well ahead of any European country for the past few years. Where we did lag behind in the operation of privately-owned scheduled air routes—one branch of aviation only—through the sudden expansion of the past twelve months our position in this regard has been immeasurably improved. Most of the new operating companies have not yet completed a full year but it is possible to estimate their annual mileage in advance, basing this upon their mail schedules and making due allowance for interruption through weather and other cause. In the accompanying table the foregoing estimates are presented in detail together with general data on the various operators.

By taking the latest available figures for European activities and making due allowance for normal expansion it becomes possible to project these into next year for comparison with our existing operations. In Fig. 1 this information is presented graphically, only the leading nations being included. German figures have been omitted intentionally because of the recent reorganization and some consequent uncertainty about the mileage to be covered under the new plans. The German mileage will probably run between the British and French. It is very evident from this comparison that the much-vaunted European air transport is now far behind that of the United States.

Early in 1925 the Ford Motor Company began operation of its Detroit-Cleveland and then its Detroit-Chicago air routes. For the first time the general public suddenly awoke to the Ford interest in aviation. The widest of publicity was given to the plans and the public suddenly began to show appreciation of the possibilities of the airplane. Men who had been developing air transport plans for a few years seized upon this opportunity to carry them through to completion, riding on the crest of a wave of favorable sentiment. Several announcements of important air transport plans followed each other in rapid succession. The timely passage of a Federal Law authorizing the Postmaster-General to contract for carrying of domestic mail by air also greatly aided this development. Within the past several months these new firms have been putting their plans into operation. The first of the new routes under the air mail contracts went into operation when the Florida Airways Corporation started running on April 1, 1926.

IT is very evident from the comparison presented here that the much-vaunted European air transport is now far behind that of the United States. In fact, American operations are at present as extensive almost as those of all European countries combined

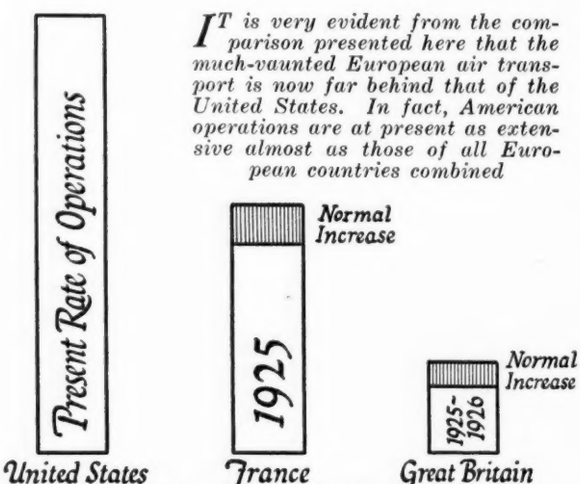


Fig. 1-Annual Mileage of Air Transport Routes as Indicated for Year 1926-27

*Portion of a paper presented before a joint meeting of the American Society of Mechanical Engineers, the Aero Club of Pennsylvania and the Engineers' Club of Philadelphia, Sept. 7, 1926.

It is pleasing to be able to record that all of the equipment in use on our airways is of domestic construction. The 400-horsepower Liberty engine, which was so severely criticized during the war, has more than vindicated itself. It has also proven more versatile than, perhaps, its designers anticipated, having been the standard powerplant of most of the larger commercial airplanes to date. Of course, as might be expected, present indications now point to its early displacement by some of the more recent types. Among the smaller airplanes, such as have been used for aerial "taxi" services, the 90-horsepower Curtiss OX engine has been used almost universally until recently. It was with this engine that most of the non-scheduled operators built up their reputations. Gradually the newer and post-war types of engines are coming into use and such models as the Wright "Whirlwind" and the later Curtiss, Packards and others are finding their way into service.

American Engines Best

Recently there has been a marked drift towards the air-cooled type, at least in the sizes less than 500-horsepower. While the choice of engine has in the past been influenced largely by the availability of war surplus material, popularity of the newer models is increasing. It is significant and worthy of mention that no foreign engine has been able to hold its own against the domestic product in the hands of civil operators.

The first civil operations after the war were started with war-surplus Navy flying boats, Army DH-4s and Curtiss JN-4 airplanes. The first-mentioned were used in the early operations of Aeromarine Airways, the second by the U. S. Air Mail Service and the last were used largely by the operators of "aerial taxi" services. It should, of course, be noted that radical alterations were usually made in order to convert these types to civil use. Gradually the war-surplus types have been replaced by more recent and better suited designs and in a short time they will have completely disappeared. Present operations are being carried on with such later types as the Douglas Transport; American Fokker; Curtiss "Lark" and "Carrier Pigeon"; Waco; Swallow; Buhl-Verville; Martin; Loening; Elias; Sikorsky and others. Every one of these represents modern development and each has been designed for some specific use. As the field of civil aviation grew,. distinctions between the various applications became clearer and these distinctions became reflected in the design of the later airplanes. No operator would today think of purchasing an airplane without first determining which make and model was best suited to his purpose. And the make which is best suited for one purpose is frequently a complete misfit if applied to some other use. The various manufacturers have come to appreciate this and many of them now confine their productive efforts to satisfying only one class of service. This condition is somewhat analogous to the manufacture of passenger cars, trucks and buses in the automobile field or coaches, freight cars, pullman cars and locomotives in the railroad field.

In the manner of performance the new air mail and other operators have made an excellent showing. Florida Airways Corporation, flying over a route previously uncharted, maintained an operating efficiency of 97% to date. Western Air Express flying 1300 miles daily, has been running from April 17 to the date of writing without even a forced landing. The Ford Motor Company has been running for several weeks without interruption of schedule, making three round trips daily with only two airplanes, the reserve craft having remained idle meanwhile. Robertson Aircraft Corporation made 219 single trips out of a possible 220, the one missed being caused by a severe storm forcing a landing and in this case the mail was forwarded the remaining few miles by rail. W. T. Varney's pilots flew about 75,000 miles with only one forced landing. National Air Transport, operating about 2,000 miles daily through a portion of the area subject to cyclonic storms, showed an average of 97% arrivals on time for its first three months. Losses of airplanes through accidental damage have been extremely rare.

Aerial advertising is an interesting phase of aviation which is being developed and this may, in future, become of considerably more importance that it is now.

On the whole, civil aviation in the United States has little to be ashamed of and much to be proud of. In a world of subsidies it has much more than held its own and with but little artificial stimulus. Indeed, the *only* artificial stimulus has been the operation of the Government Air Mail Service. For several years past American aviation has maintained its mileage with that of any other nation—foreign propaganda notwithstanding! With this year's tremendous increase in our scheduled services, our mileage will rise to a point where no amount of propaganda can hide the fact that the United States leads the world in aviation.

Scheduled Air Transport Operators in the United States

(Copyright, 1926, by Archibald Black)

Name	C.A.M. No.	Route	1-way Miles	Annual Mileage Estimated	Started
Colonial Air Transport Inc.	1	Boston-Hartford-New York	225	135,000	July 1 1926
Robertson Aicraft Corpn.	2	Chicago-Springfield-Peoria-St. Louis	278	156,000	April 15 1926
National Air Transport Inc.	3	Chicago-Moline-St. Joseph-Kansas City-Wichita-Oklahoma City-Ft. Worth and Dallas	1000	736,000	May 12 1926
Western Air Express Inc.	4	Salt Lake City-Las Vegas-Los Angeles	650	455,000	April 17 1926
W. T. Varney	5	Elko-Boise-Pasco	435	130,500	April 6 1926
Ford Motor Co.	6	Detroit-Cleveland	91	54,353	April 13 1925
Ford Motor Co.	7	Detroit-Chicago	237	161,925	June 1 1926
Pacific Air Transport Inc.	8	Seattle-Portland-Medford-Sacramento-San Francisco-Fresno-Bakersfield-Los Angeles	1121	672,600	
Charles Dickinson	9	Chicago-Milwaukee-LaCrosse-St. Paul-Minneapolis	377	263,900	June 7 1926
Florida Airways Corpn.	10	Atlanta-Jacksonville-Tampa-Ft. Myers-Miami	683	409,800	April 1 1926
Clifford Ball	11	Cleveland-Pittsburgh	120	72,000	
Colorado Airways Inc.	12	Cheyenne-Denver-Colorado Springs-Pueblo	199	119,400	May 31 1926
Philadelphia Rapid Transit Air Service	13	Philadelphia-Washington	120*	168,000	July 16 1926
Stout Air Services Inc.		Detroit-Grand Rapids	142*	85,200	July 31 1926
Ryan Airlines Inc.		Los Angeles-San Diego	120*	119,225	Mar. 1 1925
New Orleans Airline	Foreign mail	New Orleans-Pilottown	80	23,000	April 9 1923
Edward Hubbard	Foreign mail	Seattle-Victoria (B.C.)	84	20,000	Oct. 15 1920
U. S. Air Mail Service	U.S.M.	New York-(New Br.) Cleveland-Chicago	726	363,000	July 1 1925
U. S. Air Mail Service	U.S.M.	New York-Cleveland-Chicago-Omaha-Cheyenne-Salt Lake City-Elko-San Francisco, (etc.)	2669	1,782,400	Sept. 8 1920 (last leg)
Key Largo City Airline		Miami-Key Largo City	50	8,200	Dec. 15 1925
Robt. S. Fogg	R.F.D	Around Lake Winnipesaukee (R. F. D. Route)	43	10,350	Aug. 1 1925

*Estimated

Babson Speakers Declare Prosperity Due to Instalment Selling

Method of extending credit to retail buyers of automobiles and other commodities has been great business aid economists say. Jordan talks on aviation.

By K. W. Stillman

INSTALMENT selling of automobiles and other commodities has had much to do with the country's prosperity during the last several years in the opinion of William T. Foster, of the Pollak Foundation, who was one of the principal speakers at Babson's National Business Conference last week.

Without instalment selling, he doubts whether the country would have been able to stave off a bad business depression. He doesn't think the system can be conducive of permanent prosperity but he regards the principle on which it is founded as sound in its present development.

Another speaker who favored instalment selling was Edwin C. Vogel, vice-president, Commercial Investment Trust Corp. His views and those of Mr. Foster are outlined in the accompanying article.

THE expansion of instalment selling has saved the country, up to this time, from marked business depression but there is a question as to how much longer it can exercise this influence upon general business.

Although the engineering stage of aviation has progressed far and the production stage is close at hand, the American public is not yet air conscious and business men and capitalists have not yet discerned in aviation a new commercial possibility.

These were the main thoughts of interest to the automotive industry at the 13th annual National Business Conference held at Babson Park, Mass., September 11 to 19.

At the session devoted to instalment selling trends, William T. Foster, Pollak Foundation, said that while the general opinion seems to be that "instalment selling is all right if it is not overdone, it would be nearer the truth to say that instalment selling is helpful to business temporarily for the very reason that it is overdone."

The basic meaning of the recent growth of instalment selling, particularly in automotive lines, is that in a period of increasing productivity industry turns out more consumer's goods than consumers can buy with their incomes. According to Mr. Foster, there is always a piling up of stock that cannot be sold for cash without a fall of prices during every period of business expansion.

This condition, he said, arises from two causes: First, because industry does not disburse to consumers—as wages, rent, interest, etc.—enough money to buy its products; second, because consumers under the necessity of saving do not spend even as much as they receive. Since consumers, then, cannot buy the goods with current income, industry has resorted to instalment selling by which much of the purchase price comes from future income.

During 1925 about three billion dollars, or 7.5 per cent of the total sales to consumers, is represented by the unpaid portion of goods bought on instalment. This three billion dollars of goods were actually produced, said Mr. Foster; most of them would not have been sold at all had the buyers been required to pay cash for them, and, finally, the people who bought these goods could not possibly have paid for them out of income.

In addition, said Mr. Foster, if a means had not been provided for thus passing on to consumers this three billion dollars' worth of goods in excess of what they have yet paid for, most of these goods would not have been produced at all. And in this case the wages and dividends paid in connection with the production and sale of these goods would not have been paid. For these reasons Mr. Foster believes that the growth of instalment selling has saved the country, up to the present time, from a marked business depression. As proof, he suggests that if even one billion dollars' worth of goods now in consumers' hands and unpaid for had not been made, it would have had a very bearish effect upon general price levels, yet experts in the automotive industry claim that sales in that field alone would have suffered by that amount without the aid of time payments.

Mr. Foster contends that it is a fallacy to fear that the expansion of credit due to instalment selling will aid in bringing on a depression. Ordinary credit expansion, he said, is for the purpose of increasing production while credit expansion for instalment purposes is to increase consumption—a factor of direct opposite influence.

Instalment selling, however, according to Mr. Foster, cannot permanently produce prosperity. He believes that for business as a whole instalment sales of today are made partly at the expense of sales at some future date. A person with an annual spending power of $10,000 can, by postponing payment of, say, $1000, increase his present purchasing power to $11,000. Next year, however, to continue buying at the rate of $11,000 he must mortgage $2000 of his future income, since payment of his

first instalment will reduce his cash purchases to $9000. In the third year $3000 of deferred payments must be assumed, and so on. Obviously, says Mr. Foster, it is impossible to continue this rate indefinitely so that to expect permanent prosperity from instalment selling would be in error.

In conclusion, Mr. Foster stated that the principle behind instalment selling is right—that something should be done to enable the people, as consumers, to acquire and enjoy whatever they, as producers, can produce. It is better, he believes, for people to acquire goods on partial payments than not to acquire goods at all simply because they have not been made.

Thinks Future is Safe

In the second paper read at the instalment session, Edwin C. Vogel, vice-president, Commercial Investment Trust Corporation, spoke very favorably of instalment sales and even stated that a serious business depression would be unlikely to have a very detrimental effect upon payments.

This opinion was based upon the experience of his company with instalment paper from the coal mining district during the strike. From Jan. 1 to Sept. 1, 1925, the company financed about $1,800,000 of instalment sales, yet during a 5½ months' strike when unemployment was practically 100 per cent, total losses aggregated but $15,000 in excess of the normal credit reserve.

In view of the fact that a country-wide business depression would scarcely lower employment more than 10 per cent below its present level, Mr. Vogel has little doubt that soundly created instalment paper, even in such a period, will pay out.

Another factor suggested as making for the safety of instalment paper is the diversity of risks. The average outstanding paper on automobiles, Mr. Vogel said, is less than $400 and that is owed in instalments from the butcher, the baker and the candle stick maker—from buyers in every sort of business and in all parts of the country. The funds furnished by instalment financing companies to an industry, Mr. Vogel emphasized, are not paid back by that industry but by people in entirely different occupations, thus creating the widest possible diversity of risk.

Mr. Vogel believes that instalment selling has contributed largely to our present prosperity and said the continued prosperity of the automotive industry, which has been based upon instalment sales, has been the greatest factor in keeping business as a whole in a prosperous condition.

Commercial Aviation a Reality

In the session devoted to the future of motor and air transport the fact was emphasized by both speakers, Edward S. Jordan and W. Irving Bullard, president, Colonial Air Transport, Inc., that commercial aviation is here, that it may be only a matter of months when this type of transportation will be recognized by business men as a safe and sure means of speedy movement of mail, express and passengers.

According to Mr. Jordan, aviation is now just passing through the engineering stage of its development. Designers and engineers are still more interested in developing an original design than they are in bringing out something which can be recognized by business men and capitalists as a standard type. This phase corresponds to the automotive industry of 20 years ago he said, and is a stage through which every industry must pass.

Both Mr. Jordan and Mr. Bullard indicated their belief, however, that this stage was very nearly at an end and that already there have been developed types of aircraft of such designs that business men are seeing in them standard types warranting exploitation. At the present time capital has not been entirely convinced that air transportation offers a good commercial opportunity but the time is rapidly approaching when there will be as much financial backing for this industry as there has been for railroads and automobiles.

According to Mr. Bullard, the American public is not yet "air conscious" but with the ever increasing knowledge which they are getting this state of mind is rapidly being acquired.

Three things are needed, he said, to really put aviation on the commercial map of the country: Lower production and operating costs, more landing fields and better lighting facilities. Lower costs can come only through larger production, so probably must wait until other factors increase the demand for aircraft. The problems of landing fields and lighting of air routes are being solved with the aid of the government and as an instance of this Mr. Bullard said that plans had been submitted to Washington for providing landing fields and lights along the route from Boston to New York over which his company operates and these plans are expected to be fulfilled before the end of the year.

The greatest commercial problem now is the dropping of packages while in flight. Mr. Bullard stated that landing and taking off present no problems now and will be of even less importance in the near future as he expects the development of planes which can operate vertically.

About 400 miles is the economic limit of a non-stop flight for an airplane so that he sees no hope of developing trans-Atlantic airplane service. Dirigibles will be used in this service and he believes it is only a question of time when regular service between this country and Europe will be developed.

Air transportation is safer now than automobile transportation, according to Mr. Bullard. Because it is new all aviation matters receive a large amount of publicity and the few accidents that do occur are broadcast to the public much more thoroughly than are similar happenings in other industries. In answer to a question as to providing passengers with parachutes, Mr. Bullard said that a parachute was needed when riding in the three-engined Fokker planes operated by his company just about as much as a life preserver is needed when riding a Pullman.

Mr. Jordan again emphasized the point that the automotive industry was now in the merchandising stage and that to be successful most of the merchandising effort must be directed toward the feminine element of the population. Color and comfort are the two most important sales features and social progress is the predominating element in the mind of the prospect.

Traffic congestion will be solved by moving the merchants out of congested districts, he said. When so many people live outside the limits of cities and are provided with such easy means of transportation he sees no reason why stores and offices should all be crowded in a small section of the city. There is more floor space available for transportation out of the center and that is where much of the business of a community should be conducted.

A CABLE from London states that passenger car sales are slow, with buyers showing caution due to industrial uncertainty and also awaiting the fall exhibitions. Manufacturers are extending terms to dealers to move stocks. Commercial vehicle sales are better than had been anticipated.

British Air Ministry Experimenting With Heavy Oil Engine

Compression ignition type regarded as advantageous for air service because of higher thermal efficiency and lower fire hazard. Problem now is to speed up combustion of the fuel.

AIRCRAFT engineers are greatly interested in the possibilities of heavy oil engines for aerial propulsion because of the reduction in fire risks due to the use of a fuel of low volatility. It was with the support of the U. S. Navy that the Attendu engine was developed in Canada, and it now appears that the British Air Ministry has been promoting similar development work abroad. At the recent meeting of the British Association for the Advancement of Science at Oxford, D. R. Pye presented a paper on a compression ignition engine, of which paper and the resulting discussion we find an account in *The Engineer*.

Among other advantages of the heavy oil engine, Mr. Pye mentioned the elimination of electrical ignition equipment and a reduction in fuel costs due to the lower price of the fuel used and to the higher thermal efficiency of the compression ignition engine. So far the development work done by and for the Air Ministry has not resulted in putting a heavy oil engine into the air, but the results of the development work might all the same be a national asset if made available for other purposes.

With the object of exploring the possibilities of compression-ignition working rather with the view to using an engine of that type in airships, work was put in hand at Farnborough and also at Messrs. Ricardo's works. They were not duplicated researches, as the methods of fuel injection adopted were different. Some general considerations arose in connection with an aviation engine of this type.

In the heavy stationary type of Diesel engine, the pulverization and distribution of the fuel was accomplished by squirting it in with a high pressure air blast. The economy achieved in such engines, with their compression ratio of about 15 : 1, was very high, but the weight and complication of the necessary air compressors put them quite out of court, where weight and simplicity had to be considered. On that account, even for submarine engines where the weight was still 30 lb. to 40 lb. per horse-power, a method of fuel injection had been developed which was independent of high-pressure air.

Mixing of Fuel and Air

Reliance was largely placed for the proper mixing of the fuel and air upon either turbulence in the cylinder or upon the penetration of the jet itself. Provided that satisfactory mixing and combustion of the fuel and air could be brought about, it could be assumed that a compression-ignition engine with its high expansion ratio might be expected to consume a smaller weight of fuel per horse-power than a gasoline engine, and since the effective weight of power plant for an airplane, which had to get off the ground fully equipped with fuel, was the total weight of engine and fuel, any reduction in the fuel weight necessary for a given journey might be set off against an increase of weight in the engine itself. The longer the journey the more would high fuel economy compensate for a heavier engine. Allowing for that factor, it could be claimed that at a weight of 3 lb. per horse-power, the compression-ignition engine would be a serious proposition for heavier-than-air craft, and could compete with the gasoline engine at a weight of 2 lb. per horse-power.

Magnitude of Problem Indicated

That position had not, of course, yet been reached. It should be borne in mind that the gasoline engine at 2 lb. per horse-power maintained a brake mean effective pressure of 130 lb. per square inch up to speeds of 2000 r.p.m. and higher, corresponding to mean piston speeds of about 2300 ft. per minute. The highest output obtained with direct injection engines in commercial use was of an order corresponding to a B.M.E.P. of 70 lb. per square inch at piston speeds of 1500 ft. per minute. Those figures indicated the magnitude of the problem to be faced, for the only hope of reducing the weightpower ratio of such an engine to within the range of possibility for air work must involve an increase of the mean piston speed to about 2000 ft. per minute while maintaining at the same time a brake mean effective pressure of at least 100 lb. per square inch. At those speeds the time available for injecting and vaporizing the fuel became exceedingly short, and a host of difficulties was encountered in the attempt to obtain reasonably complete combustion of both fuel and air.

The problem which had to be solved was the attainment of the necessary mean effective pressure in conjunction with a controlled maximum pressure and the employment of a cycle in which, after the first part of the fuel had been burnt at constant volume, combustion of the remainder occurred at as near the agreed maximum pressure as possible. The problem which the single-cylinder research worker set out to investigate was what maximum output, measured as (B.M.E.P.) x (mean piston speed), there was any hope of attaining from a compression ignition cylinder with a reasonable bore/stroke relation, the maximum pressures being also limited to allow of light construction.

Combustion in a direct-injection engine involved a number of chemical and physical problems of the greatest interest and variety, which presented a wide field for further research. It was necessary, in the first place, to form a fuel jet which would deliver a definite quantity of fuel during a predetermined time interval, and, while doing so, would penetrate the compressed gas sufficiently

to give adequate mixing of the fuel and air. Combined with that penetration there must be sufficient breaking up, or "pulverization," of the fuel to promote its vaporization and combustion in the extremely short time available. Those problems immediately raised the question of the dependence of the penetration of a jet and of its pulverization upon the delivery pressure, upon the pressure, density and temperature of the gas into which it was squirted, upon the constancy of fuel pressure during delivery, and upon the design of the nozzle.

Researches on jet formation had been carried out by Reihm and by Miller and Beardsley. There were two methods of producing the necessary fuel jet. In one system, an approximately constant pressure was maintained in the fuel supply in the immediate neighborhood of the injection valve, and the admission of fuel to the cylinder was controlled by the opening and closing of that valve by a cam and spring in the usual manner. There were certain advantages in a constant injection pressure, and in that method, moreover, the beginning of injection was controlled in a very positive manner. It was with that system that the best results, on a single-cylinder unit, had so far been obtained.

In the other method, the "jerk pump" system, the admission of fuel to the cylinder was controlled by a spring-loaded valve which was opened and closed by the rise and fall of pressure in the oil fuel itself. There was, however, a variety of problems involved in jerk pump injection which only long and careful research could solve sufficiently to place the designer on firm ground in judging the characteristics of his jet. The difficulties inherent in the otherwise advantageous alternative, of opening and closing a valve which admitted fuel under approximately constant pressure, arose from the necessarily very small and very rapid movement of a robust valve spindle.

Tentative Conclusion Reached

Certain tentative conclusions could be stated as the result of the research work which had been in progress. As far as he was aware, no multi-cylinder engine of the compression-ignition type had yet been built at anywhere near 3 lb. per horse-power, although a two-cylinder unit of the "Attendu" engine came out at about 4 lb. per horse-power. The fuel consumption in it was, however, 0.6 lb. per brake horsepower, and unless that figure could be largely improved upon, an engine even at 3 lb. per horse-power could not compete with the petrol engine for heavier-than-air craft. The single-cylinder work had shown that it was possible, nevertheless, to obtain a cylinder output expressed as (B.M.E.P.)x(piston speed), or, in other words, as horse-power per square inch of piston area, nearly on a level with that of a high-duty petrol engine, and that that could be done without going more than a little beyond the maximum pressures customarily allowed for, and with a considerably lower fuel consumption

To get the piston speed, a large cylinder was desirable in order to keep down the revolutions, and that would involve some increase of weight in crank shaft and crank case construction. But even allowing for that it should be possible, if the performance obtained with a single cylinder could be reproduced on a complete engine, to keep the weight/power ratio within the limit of 3 lb. per horse-power. The design difficulties of reproducing those research results in a multi-cylinder engine were, however, very formidable. If the successful R. A. E. method of fuel injection was to be applied on a complete engine, the problem had to be faced of carrying an overhead cam shaft in a sufficiently rigid cylinder head construction to give the very small lift and the precise timing accurately and continuously, on a series of cylinders. The weight could possibly be reduced by the development of the two-stroke cycle engine.

His main object in dealing with what was being done by research and experiment was to bring to the notice of engineers generally what could be done in the design of a high-duty engine using compression ignition of a directly injected liquid fuel. For a variety of purposes, that type of engine offered great possibilities of development, both as regarded fuel economy and the saving of weight in material. But only by the closest attention to the fundamental conditions of jet formation and combustion would it be possible to achieve the economy which should go with the high-expansion ratio. The engine was a striking example of a field of investigation in which the designer was really waiting upon the research worker to give him guidance on the intimate details of his work.

Impressed by High Efficiency

In the discussion Sir Dugald Clerk said he had been much impressed by the high efficiency of 38.8 per cent. which had been obtained in recent work. Personally, he had always thought it should be possible to obtain a brake thermal efficiency of about 40 per cent. With regard to the effect of turbulence, he thought that that phenomenon might be used in a directive manner to give the mixture required very quickly or use might perhaps be made of power from another source to get the right mixture of air and sprayed oil.

Wing Commander Cave-Brown-Cave referred to the question of the fire risk associated with using oil of a flash-point different from petrol. Referring to the general question of aircraft design, his experience indicated that the chief troubles arose in connection with the magneto and the carburetors, and he had fears that with the compression-ignition engine some trouble might arise from the method of fuel injection. His own reading of the paper was that the solving of what was essentially a physical problem was the next step. He referred to the control of operations within the cylinder. There was a factor of uncertainty arising in connection with the time it took the fuel to burn after admission to the cylinder. It was necessary to speed up that operation.

Weight and Simplicity

Mr. Pye, in concluding the discussion, said, with regard to Sir Dugald Clerk's suggestion to fit what would be an auxiliary mixing chamber, that it all came down with an aircraft engine to the question of weight and simplicity of construction. Those considerations militated against the use of an auxiliary device for pre-mixing. Perhaps for aircraft work it was problematical if a satisfactory compression-ignition engine could be worked out, but from the ordinary commercial standpoint it was worth while going ahead with the experimental investigation. With regard to the additional safety which would be attained if an engine of the type under discussion could be used for aircraft, that was of more importance for commercial than for service machines. The saving in cost of insurance by a reduction of the fire risk would be important in the case of companies engaged in the commercial air transport business.

He agreed that at the present time the urgent problem which should be attacked was that of speeding up the process of combustion of the fuel. If something could be achieved to solve that problem, it would be a great step forward.

Automotive Industries
September 23, 1926

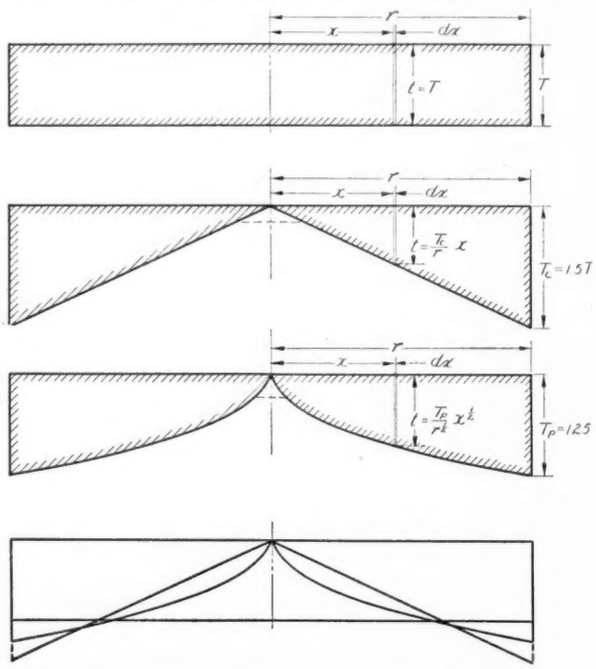
Piston Head of Uniform Thickness is Best Heat Conductor

With a given weight of material, the temperature at the center will be a minimum if head is of uniform thickness throughout, or plane type.

By P. M. Heldt

WITH the increase in piston speeds it is of the utmost importance that the weight of reciprocating parts be reduced as much as practical, and the problem of the most advantageous or most rational distribution of the material in these parts is therefore of practical interest. So far as the piston head is concerned, it must dispose of the heat as rapidly as absorbed by conduction in a radial direction toward the ring belt, without causing too great a drop in temperature between the center of the piston head—which is naturally the hottest part—and the circumference, as too great a temperature drop in the head is apt to mean an excessively hot center, giving rise to pre-ignition under the least provocation. In addition, of course, the head must be capable of withstanding the mechanical stresses to which it is subjected by the gaseous pressure within the cylinder and the inertia of its own material.

One might expect the efficiency of the head material from the heat conduction standpoint to be a maximum if the density of heat flow were the same at all points. This relation holds if heat or electricity is to be conducted at a given rate between two points or parallel surfaces. The present case is somewhat different, however, as a good deal of the heat enters the piston near its outer edge and has to be transmitted only a very short distance, while some enters near the center and must be conducted a much greater distance.



The three upper views are sections of the plane, conical and parabolic piston heads, respectively, and have the abbreviations used in the mathematical analysis marked in. The dotted lines at the center of the conical and parabolic sections indicate that in these types the thickness would not be allowed to come down to nothing at the center. The lower view shows the sections of the three types of head superimposed

We will investigate three different forms of piston head, all having the same volume and therefore the same weight of metal. Since the outer edge of the piston is near the water-cooled cylinder wall, we can hold that at a substantially constant temperature irrespective of the form of the head. The temperature of the head will rise from the circumference toward the center, and the total rise, and hence the highest temperature of the head, will vary with the form of the latter. Evidently that form is the best which —with the assumed total amount of metal in the head— shows the lowest temperature rise from circumference to center, and therefore the lowest temperature at the center.

The three types of piston head which we will consider are: (1) the plane head of uniform thickness throughout; (2) a type of head which we will call conical, the thickness of which varies uniformly from nothing at the center to a maximum at the circumference; and (3) a type which we will describe as parabolic, in which the head thickness varies from the center to the circumference according to the law of the parabola ($y^2 = 2ax$). It is first necessary to find the thickness at the circumference of the conical and parabolic heads, relative to the thickness of the plane or uniform thickness head which will make the cubical contents (and, therefore, the weights) of all three the same.

In the following

x = the radius of any infinitesimal annular shell of the head;
r = the radius of the piston head;
t = the thickness of the head at radius x;
T = the thickness of the plane head;
T_c = the maximum thickness of the conical head;
T_p = the maximum thickness of the parabolic head.

The volume of the plane head is evidently

$$V = \pi r^2 T,$$

and the volume of the other heads must be the same.

Now let us take any infinitesimal shell of the conical head. The height of this shell, or the thickness t of the head at this point, is

$$t = \frac{T_c}{r} x,$$

and the volume of the shell of thickness dx is

$$2\pi x \times \frac{T_c}{r} x \times dx = \frac{2\pi T_c}{r} x^2\, dx$$

The volume of the entire head is found by integrating the above expression between the limits $x = o$ and $x = r$,

$$V_c = \frac{2\pi T_c}{r}\int_o^r x^2 dx = \frac{2\pi T_c}{r} \times \frac{r^3}{3} = \frac{2}{3}\pi T_c r^2$$

Since this must be equal to the volume of the plane head, we have

$$\frac{2}{3}\pi T_c r^2 = \pi r^2 T,$$

hence

$$2/3\ T_c = T \text{ and } T_c = 1.5\ T$$

That is, for the same volume the maximum depth (or depth at the circumference) of the conical head is equal to one and one-half times the thickness of the plane head.

In the case of the parabolic head, we have

$$t^2 = 2\,a\,x,$$

and since we have called the maximum thickness of this head T_p, we have

$$T_p^2 = 2\,a\,r$$

hence

$$2\,a = \frac{T_p^2}{r}$$

Substituting this in the above equation for t^2 we get

$$t^2 = \frac{T_p^2}{r} x$$

and

$$t = \frac{T_p}{r^{1/2}} x^{1/2}$$

The volume of the infinitesimal shell therefore is

$$V_p = 2\pi x \times \frac{T_p}{r^{1/2}} x^{1/2} \times dx = \frac{2\pi T_p}{r^{1/2}} x^{3/2}\, dx$$

and that of the whole piston head

$$\frac{2\pi T_p}{r^{1/2}}\int_o^r x^{3/2} dx = \frac{2\pi T_p}{r^{1/2}} \times \frac{r^{5/2}}{2.5} = \frac{1}{1^1/_4}\pi T_p r^2$$

For equal volumes

$$\frac{1}{1^1/_4}\pi T_p r^2 = \pi r^2 T$$

hence $T_p = 1.25T$.

That is, for the same volume of piston head the maximum depth of the parabolic head must be one and one-quarter the depth of the flat or plane head.

The rate of heat absorption is substantially uniform over the whole area of the piston head. This rate, of course, depends upon the temperature difference between any particular part of the piston head and the gases in contact with it. Now, the temperature of the head, of course, decreases toward its circumference, which would give a greater difference if the temperature of the whole gaseous mass were uniform. But the temperature of the gases also decreases as we approach the cool cylinder wall, which tends to even out matters and justifies the assumption of a uniform rate of heat absorption over the whole area.

The method of determining the temperature drop between the center and the circumference of the piston head is as follows: We first determine the amount of heat which enters the piston head over a circle of radius x. This heat evidently has to flow through a thin annular shell of radius x and thickness dx which envelops this portion of the head, for we must neglect any loss of heat from the under side of the piston head. The heat naturally flows through this shell in a radial direction. The length of the path for the heat through the shell is dx, and the area or cross section of its path is equal to the surface of the shell, which is equal to $2\ \pi\ x\ t$. The resistance to the flow of heat through the shell is then equal to the product of the length of the path (dx) by the specific resistance of the head material to heat flow, divided by the area of the path $(2\ n\ x\ t)$. Having found the resistance to heat flow of the shell we determine the temperature drop in it by multiplying the resistance by the rate of heat flow through it, and finally we find the total temperature drop from the center to the circumference of the head by integrating the expression for the temperature drop in the infinitesimal shell between the limits of zero and r (the radius of the head).

If we now take shells of radius x and thickness dx, the surfaces of these shells in the three cases are:

Plane: $2\pi x \times T = 2\pi T x$

Conical: $2\pi x \times \frac{T_c}{r} x = \frac{2\pi T_c}{r} x^2 = \frac{3\pi T}{r} x^2$

Parabolic: $2\pi x \times \frac{T_p}{r^{1/2}} x^{\frac{1}{2}} = \frac{2\pi T_p}{r^{1/2}} x^{3/2} = \frac{2.5\pi T}{r^{1/2}} x^{3/2}$

The resistance to heat flow of the shell is equal to its length dx, times its specific resistance to heat flow R, divided by its area. Hence the resistances in the three cases are as follows:

$$\text{Plane: } \frac{R\,dx}{2\pi T x}$$

$$\text{Conical: } \frac{r\,R\,dx}{3\pi T x^2}$$

$$\text{Parabolic: } \frac{r^{1/2} R\,dx}{2.5\pi T x^{3/2}}$$

The radial heat flow through the shell is the same in every case, namely, $\pi x^2 h$, where h is the heat absorbed per unit of piston head area.

The temperature drop in the shell is equal to the product of the heat flow into the resistance and therefore is as follows for the three cases:

$$\text{Plane: } \pi x^2 h \times \frac{R\,dx}{2\pi T x} = \frac{h R}{2 T} x\, dx$$

$$\text{Conical: } \pi x^2 h \times \frac{r R\,dx}{3\pi T x^2} = \frac{h r R}{3 T} dx$$

$$\text{Parabolic: } \pi x^2 h \times \frac{r^{1/2} R\,dx}{2.5\pi T x^{3/2}} = \frac{h r^{1/2} R}{2.5 T} x^{1/2}\, dx$$

The total temperature drop from the center to the edge of the piston head we get by integrating the above expressions between the limits $x = o$ and $x = r$. We then get

$$\text{Plane: } D = \frac{h R}{2 T}\int_o^r x\, dx = \frac{h R}{2 T} \times \frac{r^2}{2} = \frac{h R r^2}{4 T}$$

$$\text{Conical: } D_c = \frac{h\,R\,r}{3\,T}\int_o^r dx = \frac{h\,R\,r}{3\,T} \times r = \frac{h\,R\,r^2}{3\,T}$$

$$\text{Parabolic: } D_p = \frac{h\,r^{1/2}\,R}{2.5\,T}\int_o^r \chi^{1/2}\,dx = \frac{h\,r^{1/2}\,R}{2.5\,T} \times \frac{r^{3/2}}{1.5} = \frac{h\,R\,r^2}{3.75\,T}$$

Hence the temperature drops between the center and the circumference with the three types of head are related as follows:

Plane	:	*Parabolic*	:	*Conical*
$\frac{1}{4}$	:	$\frac{1}{3.75}$	:	$\frac{1}{3}$
25	:	26.7	:	33.3

This shows plainly the superiority of the plane head over the other forms from cooling point of view.

Another fact that is obvious from the equations for temperature drop in the piston head is that it is much more difficult to effectively cool pistons of large than of small bore engines. It will be seen that in every case the temperature drop (or rise) varies as the square of the piston head radius and inversely as the thickness of the head. Ordinarily the thickness of the head would not be increased any more rapidly than the radius, hence the temperature rise from circumference to center would increase directly as the radius, or as the bore of the cylinder. To insure equal cooling conditions for pistons of all sizes, the thickness of the piston head should increase in proportion to the square of the bore. This justifies the relatively large amount of metal in the piston heads of the Liberty aircraft engine.

Some consideration, of course, must be given to the mechanical stress induced in the piston head by the pressure of the explosion and by the inertia forces. Both of these forces are uniformly distributed over the whole area of the piston head—the former absolutely and the latter substantially.

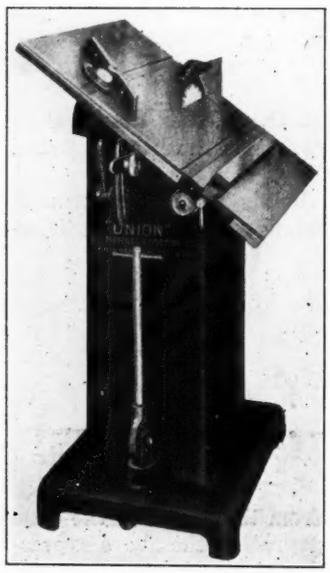
According to Grashof's theory, when a circular plate of uniform thickness and fixed at its circumference is subjected to a uniform pressure over its entire area, the stresses induced in the material are greatest at the center and at the circumference. The stress at the center, however, is only one-half as great as the stress at the circumference, and is given by the equation

$$S = 0.34\left(\frac{r}{t}\right)^2 p,$$

where r is the radius of the unsupported part of the piston head, t the thickness and p the pressure on the cylinder head in lb. per sq. in. This indicates that as far as mechanical stress is concerned it would be permissible to make the head somewhat thinner toward the center than at the circumference. On the other hand, with the light alloys now largely used as piston material, under certain operating conditions the center of the piston approaches dangerously to the melting point, with the result that the material at this point loses much of its mechanical strength. It is therefore a very fortunate thing that apparently the factor of safety of the head is somewhat greater in the center, for with the weakening of the material due to the higher temperature of the center this excess strength is probably largely lost and the actual factor of safety very nearly the same throughout the head, which corresponds to the most efficient utilization of the material from this point of view.

Portable Universal Saw

OF interest to wood working plants of the automotive industry is the portable universal saw recently developed by Gallmeyer & Livingston Co., Grand Rapids, Mich., which combines the advantages of portability with rigid cast iron pedestal. Two rollers in the back and stationary feet at the front provide a firm floor setting when in use and there is a third roller in front which can be brought into play when the saw is to be moved.



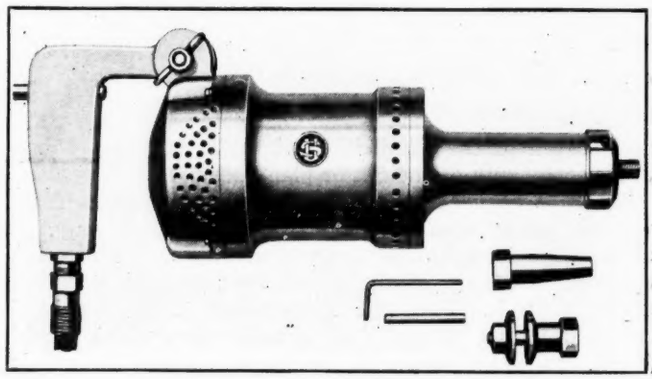
Portable saw developed by Gallmeyer & Livingston Co.

The motor and all working parts are built into the upper part of the machine and can be removed from the pedestal to form a bench type saw if so desired. A ½ hp. induction motor to be operated from a lamp socket or a 1 hp. motor to be operated from a power line is furnished. Belt drive is employed. The table is 25 by 26 in., is fitted with removable throat plate for the use of dado heads, cope heads, grooving saws, etc., and can be tilted and locked in any position up to an angle of 45 deg. The 8 in. saw is properly guarded and can be raised from flush with the table to 2½ in. above.

The cross cut gage can be used on either side of the saw. The ripping gage is machined on both sides and can also be used on either side of the saw.

THREE new portable, electric tools—tapper, grinder and drill—have been developed by the United States Electrical Tool Co., Cincinnati, Ohio. The tapper operates on either direct or alternating current and is so designed that the chuck automatically reverses itself when the operator gives a backward pull. When tapping, the clutch has a positive engagement and when extracting the engagement is by a friction clutch. This feature is said to eliminate tap breakage.

The new grinder is especially suited for grinding dies, welded parts, fins on light castings and similar jobs where speed and accuracy are necessary.



New U. S. portable grinder

Here and There in Foreign Markets

By special arrangement with the Automotive Division, Bureau of Foreign and Domestic Commerce

Canadian Production and Exports

THE Canadian automotive industry slackened its production somewhat in July but the output of 15,208 units was 26 per cent larger than that of July, 1925. During the past month Canada imported from the United States 2795 passenger automobile units and 215 motor truck units. Most of the Canadian exports which aggregated 2641 passenger cars and 1517 trucks, went to various parts of the British Empire, with Australia and India the leading markets.

Egypt May Change H. P. Rating

CONSIDERABLE discussion is now going on in Egypt concerning the substitution of the Continental formula of horsepower rating for the formula employed by the British Royal Automobile Club. The adoption of the Continental formula should afford added advantage to American cars and further development will be eagerly awaited. The automotive vehicle tax is actively undergoing revision and, in fact, the law has already been drawn up and is now being examined by the Mixed Courts before promulgation. It is understood that the Government looks with favor upon one-ton and two-ton trucks and when the new taxation law becomes effective this market for light trucks should be greatly increased and should likewise be of particular interest to American manufacturers.

Concrete Roads for Buses

A TOTAL of $145,000 is to be spent on new concrete roads in the municipality of North Sydney. It is intended to concrete the roads on the motor bus routes, as it has been found that the cost of maintaining macadamized roads is as great as the principal and interest intvolved in building concrete roads.

Restriction on Bodies Modified

A RECENT Portuguese order provides that passenger automobiles with bodies of wood and metal, fitted with pegamoid, artificial leather or similar material, may be imported into that country if the weight of the car with the body does not exceed 1500 kilos. Importation of passenger automobiles weighing over 1500 kilos and of all closed cars with bodies of material other than metal, has been prohibited since Sept. 30, 1924.

German Feud Patched Up

A LONG feud between the associations of German automobile manufacturers (Reichsverband der deutschen Automobil - Industrie) and the dealers association (Deutscher Automobilhaendler-Verband) has recently been successfully terminated. The truce between the two associations has already led to a beneficial effect in the question of automobile exhibitions. The much debated International Automobile Exhibition in Cologne which was planned for 1926 and which did not have the approval of the Manufacturers Association has been abandoned. The German automobile industry will stage an international special exhibition for motor trucks and other specialized automotive vehicles outside of passenger cars, i. e., street cleaning, fire fighting equipment, etc., in the spring of 1927, at Cologne. A general international passenger car, truck, motorcycle and accessory exhibition will be held in the fall of 1927, in Berlin.

New Swedish Passenger Car

IT is reported in Sweden that a serious attempt is about to be made to establish the manufacture of a medium priced passenger car in that market on a large scale production basis. This vehicle will be produced practically entirely from Swedish raw materials and will be assembled from parts manufactured in different factories equipped to specialize. Ten cars have already been produced as an experiment and if plans materialize it is expected to manufacture about 3000 cars during the coming year. While many believe that Swedish production will be unable to meet the competition from imported cars under the present duty rate of 15 per cent, it is possible that the new industry will require a higher duty protection. It is not considered likely, however, that such an application for higher duty will be approved. This new plant appears to be in the hands of people with manufacturing experience and it would be advisable for American automobile producers to keep a close eye on development of this new factor in the Swedish automotive market.

Road Congress Oct. 5

THE date of the Second Uruguayan National Road Congress, which was to be held in Montevideo in June, has been postponed until the week of October 5 to 12.

Porto Rican Tax Increase

INCREASES in the fees charged for licensing commercial vehicles are contained in a bill recently enacted at the Special Sessions of Congress in Porto Rico. As a result of the new legislation the license fee for a commercial vehicle of a carrying capacity of 1 ton or less is now $30 per annum, and for each ton or fraction thereof there is an additional charge of $15 up to three tons capacity. Commercial vehicles having a capacity of over three tons shall pay $100 a year for the first three tons, plus $50 a ton or fraction thereof in excess of three tons of weight of the vehicle and its load.

Australian Duties Increased

AUSTRALIAN duties on pneumatic rubber tires and motor chassis were increased effective July 9. The Federal Ministry now proposes, as a result of the general dissatisfaction aroused, to suspend the increases. Pneumatic rubber tires and motor chassis would be dutiable at the old rates, as previously reported, should the proposal become a fact.

Increased Power and Simplified Drive Are Features of New Gridley Automatic

Higher speeds and heavier feeds possible with improved single spindle automatic turret lathe, thus making for larger output.

A NEW improved model of the Gridley single spindle automatic turret lathe was placed in production recently at the Windsor, Vt., plant of the National Acme Co. The new machine has increased power, making it possible to use higher speeds and heavier feeds, thus increasing its production.

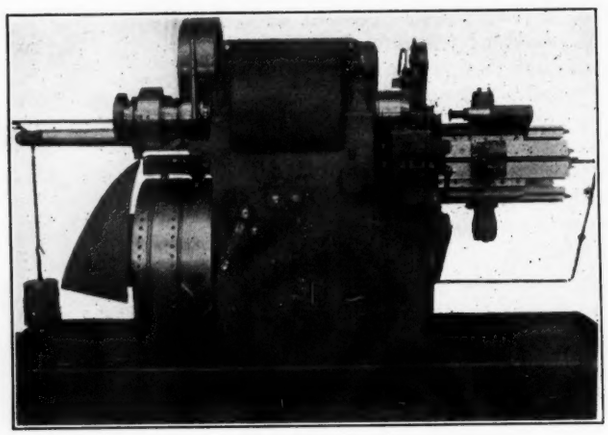
Following the general lines of the earlier model, the machine comprises a square section turret cast integral with and supported by a heavy stem. This stem is supported in substantial bearings at opposite ends of the frame. Long, narrow tool slides are gibbed to the four faces of the turret and are operated by cams. The axis of the turret is below and slightly to the rear of the spindle axis, and when the turret is indexed it brings another stock stop and another tool slide into the working position. The slides are of such design that the tools need not overhang their support and more than one tool can be used at a time, one tool being located behind the other on the slide. Forming tools are carried on the front cross slide and on a swinging cut-off arm fitted with an inverted blade.

One of the chief improvements over the previous model is in the simplification of the drive. Where formerly either two main driving belts and two auxiliary belts with countershaft, or a large size direct current variable speed motor were required, the drive is now either by a single wide belt or by a single constant speed motor. This is made possible by the provision of a geared head built into the headstock, which contains one set of pick-off gears by which both the spindle speed and the feed can be changed simultaneously, and another set of gears which changes only the feed.

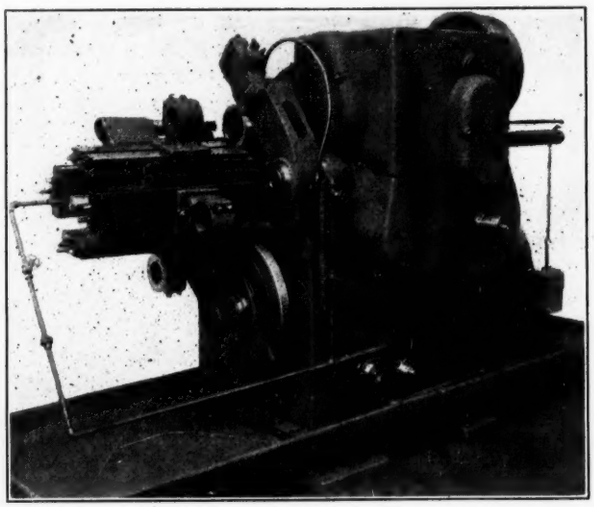
Power for driving the machine is received by a large diameter pulley located at the left of the machine back of the chuck operating mechanism. The shaft of this pulley is supported in the headstock in three bearings, of which the one next to the pulley, which has to support the belt pull, is of the roller type. At the opposite end from the pulley this shaft carries a spur gear meshing with a gear on another shaft extending through the headstock parallel with the pulley shaft. This can be seen in the rear view of the geared head. These are the pick-off gears which can be readily replaced by another set of different ratio, thus changing the spindle speed and feed simultaneously. The pair of meshing gears seen on the right in the same illustration control the speed of the cam and therefore the feed. Both sets of pick-off gears are protected by covers which can be easily removed when changes of speed or feed are to be made.

The same as the former model, the new machine has a two-speed drive for the camshaft, one speed being by a direct drive and the other through a planetary combination. This permits of rapid motion of the feed cam while indexing and idling and the normal feed motion while cutting.

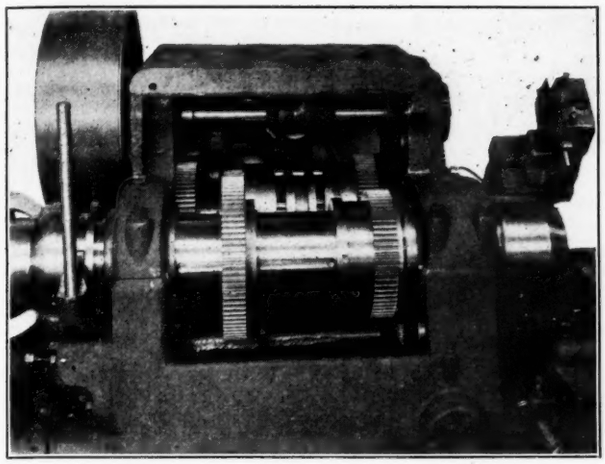
Two gears of different diameter, on the spindle drive shaft, mesh with corresponding gears keyed to the spindle. Each of the gears on the spindle drive shaft has its own friction clutch, and one or the other of these clutches is engaged by means of a clutch-operating collar between them. With this collar engages a shifter fork which is operated from the cam drum located directly below it. In the central position of the shifting collar both clutches are disengaged, of course.



Gridley improved single-spindle automatic turret lathe, operator's side



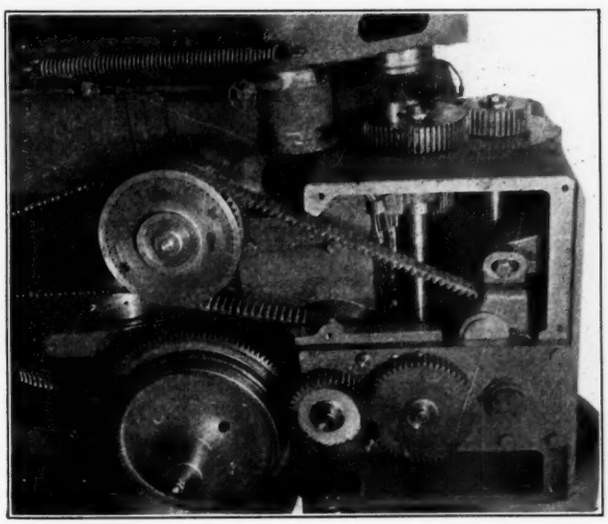
Rear view of new single-spindle Gridley



The geared head with cover removed, showing in the foreground the two pairs of gears for the two-spindle speeds

In the case of motor drive the single, constant speed motor is provided with push-button control. An alternating current motor may be used, which dispenses with the need for a rotary converter formerly required when only alternating line current was available. The motor is mounted on top of the headstock and the power is transmitted from the armature shaft by a silent chain directly to the shaft, which in the case of belt drive carries the pulley. The chain is protected by a suitable guard.

Other changes in design have been made to take account of the greater loads imposed on the working parts by the increased power available. Thus the spindle has been strengthened and provisions have been made for a more accurate support, the nose being located by a ground pilot and back plate, which ensure concentric rotation of the collets. The spindle bearings are now made of so-called high-speed bronze and are fitted by scraping. Every bearing of the machine is lubricated by oil under pressure. In the case of the spindle front bearing, oil is fed through two independent tubes, as a safeguard against failure. The usual provision is made for circulating the coolant. The manufacturer states that one man can run several machines and that changes of tooling can be made quickly.



View of geared head from rear side of machine, with cover removed. This view shows the two sets of pick-off gears, for spindle speed and feed on the left, and for the feed only on the right

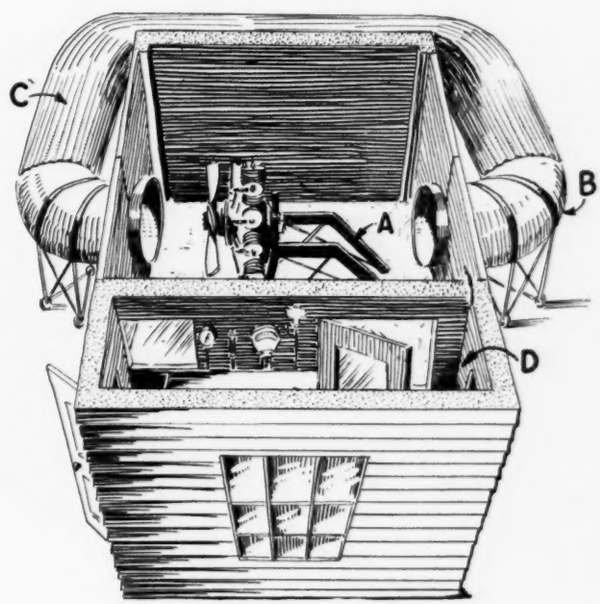
Airplane Engine Test Room at Pitcairn Field

OPERATORS of airplane transport lines or flying field operators have often to face the problem of testing an overhauled motor. At the present time when dynamometer facilities are not available the engines are usually placed in the plane and given a ground test. This method of testing, however, is inadequate in that it cannot be continued for a sufficient period to provide accurate knowledge of the performance or condition of the engine, due to overheating.

Pitcairn Aviation Co. has done away with this problem in an effective but still relatively cheap manner. A test shed, a sketch of which is shown herewith, was built, a universal test stand (A) being mounted in a shed provided with large folding doors at either end. To provide additional cooling which is not achieved with the ordinary test propeller of the club type, circular holes were cut in the folding doors immediately in front and in back of the engine test stand and three sections of piping approximately 4 ft. in diameter were provided to carry the air flow from the slip-stream of the test propeller around the outside of the building and back into the shed. The main section of this pipe (C) is made of corrugated sheet iron to provide the necessary cooling of the hot air from the engine. The two sections (B) which connect the main piping with the test chamber are mounted on a movable stand so as to facilitate removing of the engine and to permit opening of the doors.

Room for Personnel

Separate from the test chamber but integral with it, another room is provided for the engineers or mechanics carrying out the tests of the engine. This room contains the usual test instruments such as oil pressure and temperature gages, a calibrated tank to measure fuel consumption, a water temperature gage, engine speed indicator, etc. By means of this test shed, Pitcairn Aviation is enabled to test its engines fairly efficiently under all types of weather conditions, maintaining whatever air temperature is desired for purposes of conducting the tests.



Pitcairn airplane engine test plant

THE FORUM

Manufacturers Offer Comments on Bus Brakes

Discussion of the subject in recent issue brings replies dealing with lining wear and operation of power brakes.

Editor AUTOMOTIVE INDUSTRIES:

I have read with much interest K. W. Stillman's article on the much discussed subject of "Bus Brakes," which appeared in your August 26 issue. For several years we have been advocates of all metal brakes for buses, solely from the standpoint that existing brake equipment with fabric linings had proven inadequate in heavy duty service, especially with power operation, and it is almost universally accepted that power brakes are a necessity on the present heavy, high speed buses. Any combination of drum and fabric or composition lining which may be developed that will give the same service as the metal brake, without any increase in maintenance costs, would be equally acceptable to the power brake manufacturer.

While agreeing in general with Mr. Stillman's line of reasoning there is one mistaken impression which I believe worthy of explanation. Speaking of metal brakes, he says, "One objection to widespread adoption of this type of brake lies in the fact that power operation is required with any so far disclosed, since it is impracticable to obtain manually the pressure necessary to work metal to metal brakes" and in the next paragraph continues with this contradiction, "The sliding friction between the metallic surfaces is enormous so that when pressure is exerted to bring the shoe and drum together they almost lock. If the pressure is continued the bus will be brought to an abrupt stop . . . . . The pressure must be released momentarily and then reapplied and released again until the bus is finally brought to a stop."

As a matter of fact, power operation is required with metal brakes because the coefficient of friction of non-lubricated metallic surfaces at normal rubbing speeds is from .15 to .2 (which may be verified from any engineering handbook), as compared with a coefficient of friction of from .3 to .5 for fabric linings under ideal conditions. The retarding force or sliding friction is, of course, measured by the product of the normal force and the coefficient of friction, hence it follows that with metal linings the friction is normally less than with fabric lining, except when the friction of the fabric linings has been impaired by moisture or grease.

It is also a fact that the coefficient of friction between any moving surfaces increases as their relative speed decreases. With air operation therefore, sufficient power is provided to insure an efficient brake at high bus speeds when the friction is comparatively low, and very quick, smooth stops are secured by graduating off the brake pressure (by merely decreasing the foot pressure on the pedal) as the speed is reduced. This is equally true with fabric or metal brakes and quickly becomes an act of unconscious judgment so that operators are definitely instructed against the practice of momentary application and release of air brakes, or 'fanning' the brake valves as it is commonly termed.

H. D. HUKILL
Westinghouse Air Brake Co.

Adjustments Mimimized

Editor AUTOMOTIVE INDUSTRIES:

The article by K. W. Stillman, on Bus Brakes, has brought to the fore the extreme conditions encountered by the brakes on a heavily laden bus. We are particularly interested in the statement calling attention to the necessity for frequent adjustments in order that the brakes may function satisfactorily, and wish to point out that a suitably designed air brake will eliminate the necessity for any adjustment whatever up to the moment when the lining has worn to the point of disintegration.

The rapidity with which linings wear is the cause of considerable concentration on this subject, the results of which are about to become more apparent. With drums and linings of suitable hardness, but yet without impairing the frictional coefficient in any large degree, 100,000 miles without relining have been obtained in actual bus operation.

The problem of heat dissipation is in some cases acute, and this surely emphasizes the desirability, if not the necessity, of applying brakes to all the road wheels, in order to minimize the work done by each.

The criticism leveled against power brakes, in regard to the skill required to operate them, is not generally applicable, since a well designed control valve will indicate to the operator the amount of braking power he is applying, in exactly the same way as does the resistance to pedal movement in operating a straight mechanical brake. Additionally, the foot pressure required can be made just as light or as heavy as desired, and the amount of foot travel as long or as short.

Experiments indicate that rates of deceleration much greater than are at present associated with comfort are possible where the rate of change of deceleration is kept low and fairly uniform. In passenger car work deceleration in the neighborhood of 22 feet per second per second

has been obtained without undue discomfort to the passengers.

It appears to be well within the range of probability that, before many months have elapsed, brakes will rank among those components giving least trouble, instead of the opposite being the case.

FRED NEALE
Christensen Air Brake Co.

Improvised Electric Brake

Editor AUTOMOTIVE INDUSTRIES:

In connection with the article by K. W. Stillman in *Automotive Industries* of August 26, discussing bus brakes I submit the following:

About four years ago I was in charge of a large fleet of delivery trucks in New York City. As a high percentage of the routes in my territory were fairly level I had very little brake trouble except on a few trucks which operated in Yonkers—a New York suburb—where some of the grades were from 19 to 20 per cent.

As these grades were seldom used they were poorly paved and unsafe for trucks in wet weather; but due to the laziness of the truck operator, who would rather take a chance than walk a few steps, it was quite impossible to use a conventional type of friction brake on these trucks. If the leverage was changed so that the operator could lock the wheels at will he would wear flats on his tires; if the brakes were operated as received from the manufacturer the lining would simply be burnt up.

Electric Motor Installed

My final solution of the problem was to install a series wound electric vehicle motor in the center of the chassis. The propeller shaft was cut into two pieces and fitted with universal joints, one on each end of the armature shaft, making an installation similar to the present day propeller shaft brake except for the substitution of an electric motor for the brake drum.

This motor, or generator, ran free as long as the external circuit was open but as soon as this circuit was closed an E. M. F. immediately was built up due to the residual magnetism of the fields. The desired braking effect was obtained by placing a suitable resistance grid in the external circuit to dissipate the heat.

With a suitable generator the braking effect was sufficient to bring the vehicle down to a speed of two miles per hour and it could then be brought to a stop by the use of a friction brake. Although many engineers think a series generator is unsuitable for this application, I favor them for their great overload capacity.

I had two trucks equipped in this way and operated them for three years with absolutely no trouble. The weight of the trucks was about 10,000 lb. with a generator weighing about 235 lb. The resistance grid was of cast-iron and weighed about 35 lb.

It must be understood that unless a reversing switch is used to reverse the armature connections the electric brake will be effective in but one direction.

I am offering this experience in the hope that it may enable those interested in bus brakes to solve their problems electrically, as the following advantages result from the use of this method:

1. The braking effect obtained is directly proportional to the load.
2. The brake has as long a life as the chassis.
3. Brake adjustments are eliminated.
4. Greater tire mileage is possible because the rear wheels can not be locked so that the tendency to skid is eliminated.
5. When the desired braking effect is obtained by the manufacturer's installation of the correct amount of resistance the brake can not be misused by the operator.

If the above advantages warrant the additional weight and expense of electrical equipment I see no reason why it is not practical for buses.

B. H. BRITT.

Use of Speed Governors

Editor AUTOMOTIVE INDUSTRIES:

Will the use of governors on buses, as required by the new regulation in South Carolina, reduce the number of accidents on the highways? It would prevent only those accidents that are due to speeds above the legal limit (assuming that the governor allows speeds up to the legal limit).

A study of accidents, to determine what proportion are due primarily to high speed and what proportion are due to speeds within the legal limit but yet too high for safety under the conditions, or to passing another vehicle, might throw some light on the subject.

If a bus could not be driven faster than 35 miles per hour under any circumstances, would not the driver who is behind his schedule, be likely to drive at 35 miles per hour where 30 miles is the limit of safety, and be running greater risks than he would by driving at 40 miles under favorable circumstances?

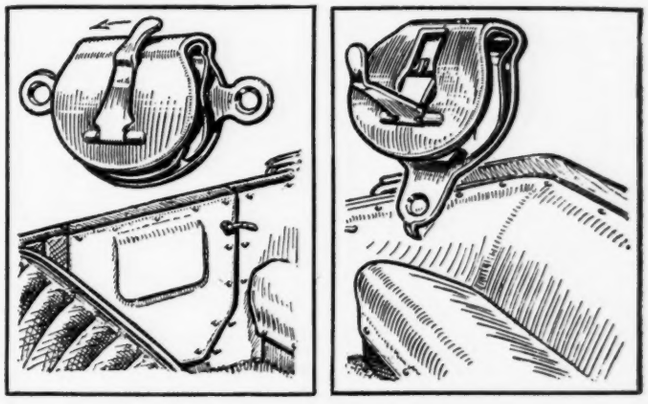
Again, if he overtakes a car traveling at 32 miles per hour and tries to pass, he has a margin of only 3 miles per hour (4.4 feet per second). It takes three times as long to pass the other vehicle as it would if he could drive at 41 miles per hour.

On a crowded highway it is frequently necessary to drive behind a slow car for several miles before it can be passed safely, even when no governor is used. The use of a governor compels the driver to drive as slow as the slowest driver on the road, or to take greater risks in passing him.

W. W. WELLS.

Tenax Loose Covering Holder

A HOLDER for seat covers, etc., which holds them secure, yet is instantly released, is being marketed as the "Tenax" loose covering clip by Ernest Turner of Northdown House, Northdown Street, Kings Cross, London NI, England. It is protected by provisional patent No. 6941. The distributor claims that it fills a want for satisfactory method of holding loose coverings.



Tenax holder for loose seat covers

Larger Bus Generators to be Recommended by A. E. A. Standards Committee

Present sizes too small and increase in capacity of 20 per cent or more is expected. Advertising campaign planned to emphasize advantages of genuine electrical repair parts.

By Donald Blanchard

IN order to bring the advantages of using genuine electrical repair parts to the attention of the car dealer, the independent repairman and the car manufacturer and to emphasize the specialized facilities offered the trade by the authorized electrical service station, the Automotive Electric Association shortly will launch a trade paper advertising campaign. This was the outstanding development of the Associations annual convention held at Shawnee-on-Delaware, Pa., last week.

Major interest at the meeting centered around the subjects of parts distribution and service, and the members of the field division who were present contributed much pertinent information relative to their needs and problems. Throughout the discussion, it was evident that both manufacturers and distributors are giving studious and open-minded consideration to the changes wrought in their market by the tremendous growth in the use of automobiles and the more insistent demands of the public for prompt and convenient service.

Although no new specifications were adopted by the Standards Committee, it was the opinion of this group that the present recommended bus generator sizes of 300 and 450 watts were too small. As soon as data necessary to write the new specifications are available it is likely that these sizes will be increased in capacity by 20 or more per cent. This change is made necessary by the large increase in the lamp load on modern buses, it being found in some cases that the current consumed by marker and running lights is in excess of that required for interior illumination.

In launching an advertising campaign to the trade in general, the Association recognizes that a considerable portion of the 80,000 service stations and repair shops in the country are never reached either by representatives of the electrical equipment manufacturers or by salesmen of central distributors of factory branches. Many of the authorized electrical service station dealers in smaller centers cannot be depended upon to merchandise either repair parts or service and this is to be expected in view of their origin. Primarily the authorized station was established to give service and in the early days men with the necessary technical and mechanical knowledge were sought for this work. Inasmuch as this type of ability is seldom found in combination with merchandising skill, promotion of the sale of genuine electrical parts and of authorized electrical service has developed largely on the factory branches of the equipment manufacturers and on the central distributors.

In view of the large number of service stations and independent repair shops to be reached, it is impractical commercially for either the factory branch or the central distributor to have salesmen call on them at sufficiently frequent intervals to be effective. Trade paper advertising provides a means of reaching the general trade at a low unit cost and, in combination with suitable follow-up work on the part of factories, their branches, central distributors and the authorized electrical service stations, is expected to divert a considerable portion of the electrical repair parts now being served from other sources, to authorized channels and to assist the authorized station in selling its maintenance service.

Although the Field Division representation was small, dealers and distributors from many of the larger centers were present. At the present time, membership in this division is approaching 400 out of a total of 2350 authorized service stations. A committee consisting of R. J. Kelleher, North East; D. W. Burke, Detroit, and Ray Thomas, Los Angeles, was appointed to pass on the distribution of the Field Division funds.

Increasing Dealer Outlets

In connection with the need for a larger number of authorized outlets, it developed that a number of distributors had found it desirable to appoint more than one dealer in a town in a number of cases and that the resultant competition more than doubled volume. It was brought out that the number of authorized stations had not increased materially for several years and that this was largely due to the elimination of a number of manufacturers from the starting-lighting field by merger. Recognition was given to the fact that the general repair shop or car dealer station must give service and it should be made easy and profitable for him to get such parts or technical assistance as he required.

Lack of suitable instruments is holding up the work of Standards Committee. In its work on bus generators, some means is desired of determining average operating speeds and lamp socket voltages. Instruments are desired that can be installed on a bus without interfering in any way with its operation and serviceability and which will give a graphic record. It is believed that bus generators and engines operate at relatively constant speeds and that these speeds do not vary materially between buses. However some authorative date are required on this subject in order to write standard specifications and to assist in the design of the units. Similar information regarding lamp socket voltage is needed by the lamp manufacturers.

It was pointed out by one engineer in a discussion in the hotel lobby that it was essential that the bus manufacturer accept the electrical equipment maker's recommendation as to the size of the unit he required. If a smaller unit is selected it is easily possible for the equipment manufacturer's entire profit to be absorbed in service expense in view of the smallness of the average order.

EDITORIAL

Cars for Salesmen

THAT the use of automobiles by salesmen has distinct advantages over train service but not because of their economy is the burden of an article in a recent issue of *Advertising & Selling*. Based on ten years of experience covering actual road operation in every State the writer finds that use of cars has cost the company $2.16 more per day per salesman than would have been the case if the men had used trains, interurbans and buses.

To offset this increased cost he points out a number of advantages which automobile use has. The first one is that salesmen are entitled to enjoy their work and the more they enjoy it the better will be their results. And he believes that a considerable majority prefer autos to trains. Use of cars gives a flexibility to the salesman's movements which permits him to cover, at least, slightly larger territory and, in many sections, to cover it much more intensively than would be possible by any other means of transportation.

Possibly the most important advantage of automobiles is the freedom of movement which they give the salesmen. They are enabled to reach small outlying towns which are inadequately or not at all served by other means of transportation; they can call on more accounts in each town with less time; and, in general, can cover their territory much more thoroughly even though the average mileage of salesmen using cars was found to be but 12 per cent greater than their mileage covered by train.

Most Essential Uses of Oil

IT is evidently to the benefit of the public that our petroleum supplies be used to the largest extent in those forms in which they are of the highest value or can be replaced only with the greatest difficulty. At the present time practically one-half of all the oil produced is used under conditions where it could be readily replaced by coal or coal gas. It would be possible to convert about 80 per cent of the crude into motor fuel, and that this is not done at the present time is due mainly to the fact that the current demand for motor fuel is not large enough to warrant it.

In the report of the Federal Oil Conservation Board it is stated that there is already a tendency to replace heating oils by coal. If such a tendency exists it must be among large industrial users and power plants, for the use of oil for house heating is certainly making rapid headway at present. It is correctly pointed out in the report that the division of crude as between the different kinds of oil products is purely an economic question. If too much gasoline is produced, for instance, then the price of that fuel will drop and the cracking process may become unprofitable.

It will readily be seen that the development of the cracking process has been of the highest importance to the automotive industry. Without the product from the cracking stills there would not be nearly enough fuel for the number of motor vehicles in service today, and the automotive industry probably never would have attained its present state of development.

Taking a long range view of the subject, it is evidently to the advantage of the motor industry, as well as to that of the general public, that as much as possible of our remaining supplies of oil should be converted into the two most valuable and most essential petroleum proucts—lubricating oil and motor fuel. Regulation of the development of pools, either by state legislation or by voluntary agreement among owners, as suggested by the Conservation Board, would have the effect of lessening the visible supply and of stiffening prices of petroleum products as well as of the crude petroleum. Such a stiffening in prices would affect most drastically those uses which have been developed chiefly as a result of overproduction and to a much lesser extent the more essential uses.

The Fonck Disaster

ASIDE and apart from the tragedy of human death which too frequently results, it is unfortunate when an accident mars a seriously undertaken attempt to advance the art of commercial aviation. It is much more so when, perhaps, by beginning at the right point in making preparations, the accident might have been avoided. In such cases it is merely human fallibility which is again established, yet in public judgment it is the art which suffers.

The recently attempted trans-Atlantic flight of Rene Fonck and Lt. Lawrence Curtin in a Sikorsky plane was broadly exploited in the daily press and the public conceived that here was a flight conducted by the world's greatest pilots with the latest word in long distance flight machines—if the thing could be done here was the combination to do it.

The Sikorsky plane has many times demonstrated its reliability and capacity. No better men could have been picked for the great adventure. But we now ask ourselves this question: With so much at stake, with such a large outlay of money necessary anyway, wouldn't it have been wise to have built a special plane, designed from the first line to the finished drawing to carry a load of 28,000 pounds, including fuel for 4300 miles, instead of trying to convert an 8800-pound capacity machine with a 700-mile cruising radius to do the trick? What is the cost of the attempt in time, money and men as things stand now?

AUTOMOTIVE NEWS SECTION INDUSTRIES

Philadelphia, Pennsylvania

Thursday, September 23, 1926

Heavy Production Schedules to Continue Into October

PHILADELPHIA, Sept. 23—Automobile manufacturing is continuing at a high production pace in response to a wave of fall buying which gives promise of being the best the industry has known. There seems to be no indication that this rate of output will be reduced importantly until well into October.

Cars in all price classes are meeting large buying in practically all parts of the country but there is more sustained buying in cars in the better priced classes. Under the influence of prosperous conditions, there is an increased turning to cars in the higher price ranges. Companies which are having the most success are those which have anticipated best the desire for improvements.

Though there continue to be scattering price revisions there is no reason to expect any general reductions. Business is flowing steadily to those companies whose products have achieved reputation and who are maintaining standards of performance and appearance. Price is a secondary question in the existing market and manufacturers are wisely not attempting to emphasize it.

The situation with the retailers is generally good. There is the usual amount of used car trading but with an excellent demand for new cars there is no need for large allowances of the old cars and dealers are taking advantage of this to keep used cars inventories in hand. Used car movement is good in view of attractive prices.

The export market is showing advances and manufacturers are increasing their efforts to develop foreign business.

Pierce-Arrow Models Ready

BUFFALO, Sept. 20—Announcement will be made next week by the Pierce-Arrow Motor Car Co. of a new series 36 dual valve six-cylinder Pierce-Arrow car to replace the present dual valve series 33 model.

The new car will be priced considerably lower than the former series 33, and according to the officials of the company the new model will not supersede or effect the smaller six series 80 which they will continue to build for the $3000 market.

Studebaker Has New Line

SOUTH BEND, Sept. 23—Studebaker Corp. of America will show new light cars having sedan and phaeton bodies at the Paris Salon next month, according to a factory announcement. Details of the new cars which will be regular production models have not been disclosed at this time.

Florida Hurricane Destroys Many Cars

WEST PALM BEACH, FLA., Sept. 20—With business in South Florida completely paralyzed because of the tropical hurricane which swept across this section last week-end, it was impossible today to say what effect this disaster will have on the automotive industry and its various branches in the storm area.

Although it could not be determined whether or not any of the automotive and accessory dealers suffered directly, it is safe to assume that sales and service establishments in several cities were demolished as incomplete reports state that in some communities not a single building was left undamaged.

The most conservative estimates place the number of motor cars lost at one thousand, most of which were owned by individuals. Hundreds of them were crushed by collapsing buildings and falling debris, while others were swept to sea in the storm waters.

Word was received here today that Claude Nolan, Cadillac distributor for Florida and South Georgia, is safe after surviving the hurricane. His yacht was one of the very few vessels that were not destroyed during the storm.

Motor vehicles have proved invaluable in supplying first aid to the thousands of injured and in caring for the hundreds of dead. It was through this means only that constant direct communication was established.

Prather Heads India Sales

AKRON, Sept. 23—C. C. Prather has been appointed general sales manager of the India Tire & Rubber Co. Mr. Prather joined the India organization about four months ago as divisional sales manager after 10 years with Goodyear in sales work.

Moon Earnings Decline

ST. LOUIS, Sept. 23—Moon Motor Car Co. earnings for the first six months of the year are reported as $322,201, equal to $1.84 a share, which compares with $671,689 or $3.73 a share in the same period of 1925.

SLOAN SEES 1927 GOOD TRADE YEAR

NEW YORK, Sept. 23—Sailing for Europe with a party of General Motors Corp. executives, President A. P. Sloan, Jr., expressed the view that 1927 will be a good business year and that General Motors probably would equal the number of vehicles sold in 1926. Sailing with Mr. Sloan were H. H. Bassett, president of Buick Motor Co., L. P. Fisher, president of Cadillac Motor Car Co., and Donaldson Brown, vice-president of the parent company.

Mr. Sloan outlined the purpose of the trip as "developing atmosphere as to the possibilities of increasing our effectiveness in European countries." The party also will visit the London and Paris shows.

As to the likelihood of the Government taxing surpluses of corporations heavily, Mr. Sloan said he though there would be no such action against corporations which are doing constructive things with their surpluses.

Ford Transmission Band Held Infringing

ST. LOUIS, Sept. 21—Federal Judge Davis, deciding that the Ford Motor Co. has been using transmission bands which infringe upon patents owned by Parks & Bohne, Inc., of St. Louis, ordered the Ford company to give an accounting and enjoined it from further use of such bands. Inasmuch as triple damages were sought by the plaintiff it is expected judgment, if the decision is not reversed on appeal, will be for approximately $2,000,000 although no definite figure is available at this time, the plaintiff contended.

Each Ford is equipped with a set of three transmission bands. Parks & Bohne sets a retail price of $4.50 installed. Parks & Bohne, now known as the P. B. Mfg. Co., Inc., has a factory here where it produces transmission bands for Ford cars and brake lining. The officers of the company are D. E. Parks, president; J. T. O'Donnell, vice-president, and W. T. Bohne, secretary-treasurer.

Steves to Sell Flint

NEW YORK, Sept. 22—Colin Campbell, vice-president of Durant Motors, Inc., has appointed C. M. Steves as assistant sales manager of the Pacific Coast zone.

Young Hupp Chief, Hastings Chairman

New President Has Been Manufacturing Executive of Company for Long Period

NEW YORK, Sept. 23—DuBois Young was today elected president of Hupp Motor Car Corp., succeeding Charles D. Hastings who becomes chairman of the board. The new president has been vice-president in charge of manufacturing for the past 12 years and is known as one of the most proficient production men in the industry.

The election of Mr. Young as president and the elevation of Mr. Hastings to the chairmanship has been spoken of for some time past. Mr. Hastings has expressed a desire to be relieved of the responsibility of the presidency, feeling that this post should be held by a younger man. That Mr. Young would succeed him was generally anticipated because of the splendid record he has built as an organizor and because of the exceptional confidence held in him by his fellow officers.

To bring Mr. Young into the Hupp organization the corporation bought out an organization with which he previously had been identified and made it into one of the manufacturing divisions of the company.

Hupp Adds Brougham Model

DETROIT, Sept. 23—A new five-passenger, two-door brougham listing at $2245 has been added to the Hup eight-cylinder line. The finish is Pelham blue offset by double black beading and gold striping. Other external features include nickel trimmed head and cowl lamps, integral sun visor and large trunk rack with polished guard bars.

Door openings are 36 in. wide and the front seats are of the tilting bucket type, both being adjustable for height. The rear seat accommodates three comfortably and well-cushioned arm rests are provided. Upholstery is gray mohair while the moldings are in walnut. The rear windows are all fitted with shades. Door handles are of the remote control type which also serve as pull-to's.

Stock Dividend Voted

DETROIT, Sept. 23—Hupp Motor Car Corp. has voted a 10 per cent stock dividend and a quarterly cash payment of 35 cents, the latter placing the stock on a $1.40 annual basis.

Landing Gear Collapse Destroys Fonck Plane

NEW YORK, Sept. 21—The accident to the Sikorsky S-35 plane while taking off for the proposed Trans-Atlantic flight, here today, as near as can be determined was due to the collapse of one wheel of the auxiliary landing gear attached to the tail of the plane. The S-35 had undergone a series of test flights successfully last week, but with a load considerably less than that in the plane at the time of the attempted start for Paris.

This additional load made necessary the installation of the auxiliary landing gear in order to enable the plane to acquire enough speed on the runway for the take-off. The wing loading at the time of the attempted start was over 25 lbs. per square foot which is practically double that of any plane designed for regular commercial transport.

Production Delegates See Heat Treat Show

CHICAGO, Sept. 22—The annual production meeting of the Society of Automotive Engineers and the convention and machine tool exhibit of the American Society for Steel Treating all of which are being held here this week, have attracted more than 200 automotive production men.

The current interest in metallurgic subjects among automotive production men was evidenced by the attention given this subject at the gear production and inspection sessions on the opening days of the S. A. E. convention, as well as by the large number who mingled with the throngs which have crowded the aisles of the metallurgical and machine tool show ever since the first of the week. The relation of heat treatment of steels to gear noise brought about considerable exchange of experiences when it was brought up by Walter G. Hildorf, of the Reo Motor Car Co., in his paper on "Gear Steels and Production of Automotive Gears."

Other metallurgical phases of automotive interest were developed at the inspection session on Wednesday when C. S. Stark, of the Packard Motor Car Co., described a new apparatus for comparing smoothness of surface finishes with a standard surface by measuring the light reflected from the surface to a photo-electric cell amplifying the current set up with an ordinary radio tube and obtaining comparative readings on a milli-ammeter.

Car Revenues Increase Despite Lower Tax Rate

WASHINGTON, Sept. 23—Despite the reduction from 5 to 3 per cent in the new revenue act which was effective three months before the close of the 1926 fiscal year, collections of Federal taxes on passenger automobiles, motorcycles, etc., increased $18,991,696 in the year ended June 30 as compared with 1925. This was shown in the annual report of the Internal Revenue Bureau. Total receipts on cars, motorcycles, parts, tires and accessories were $124,686,745 in 1925 and $138,155,194 in 1926.

Star August Net $254,957

NEW YORK, Sept. 22—Net operating profit of the Star Car Division of Durant Motors, Inc., for the month of August was $254,957 after depreciation and deduction of Federal income taxes. This makes total net operating profit of the Star Car Division for the months of June, July and August of $986,498.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, Sept. 23—Trade and industry continue to report seasonal gains, although unfavorable weather in many sections has interfered both with distribution and with crop harvesting and marketing. Commodity prices remained firm last week, the average showing little change. Stock prices moved irregularly, with no definite trend observable. The money market was temporarily easier after the completion of the Treasury's mid-September financing, but the general movement continues toward moderately higher levels.

CAR LOADINGS

All previous records were broken by car loadings of railway freight during the week ended Sept. 4, with a total of 1,151,346 cars, as against 1,136,233 cars in the preceding week and 1,102,785 cars in the corresponding period last year. Loadings for the year to date total 35,850,857 cars, which compares with 34,697,793 cars a year ago and 32,475,361 cars two years ago.

BANK DEBITS

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended Sept. 15 were 28.9 per cent above the total for the preceding week (a holiday week), but were fractionally below that for the corresponding period last year.

FOREIGN TRADE

The preliminary foreign trade report for last month shows exports of $386,000,000 and imports of $336,000,000, as compared with exports of $368,000,000 and imports of $339,000,000 in July and exports of $380,000,000 and imports of $340,000,000 in August last year. The net import balance of $17,000,000 for the first eight months of the year compares with an export surplus of $353,000,000 during the corresponding period of 1925.

FISHER'S INDEX

Fisher's index of wholesale commodity prices stood at 148.3 last week, as against 148.5 in the preceding week and 147.2 four weeks earlier. The stock price index declined from 176.0 to 175.3 during the week.

FEDERAL RESERVE STATEMENT

Bills and securities held by the Federal Reserve banks increased $123,500,000 during the week ended September 15, the most important change being a gain of $245,100,000 in holdings of certificates of indebtedness. Note circulation declined $22,500,000 while deposits increased $175,000,000 and reserves $3,100,000. The reserve ratio declined from 74.3 to 71.6 per cent.

During the same period, loans of reporting member banks increased $118,000,000, investments $50,000,000 and net demand deposits $312,000,000, while borrowings from the Federal Reserve banks declined $34,000,000.

August Production Approximates 440,000

United States Total Reaches 424,394 With Passenger Car Output 379,111

WASHINGTON, Sept. 20—Combined production of cars and trucks in the United States in August totaled 424,394 according to figures released this week by the Automotive Division of the Department of Commerce. Figures on Canadian production are absent but it is indicated that these would approximate 15,000 making the total for both countries for the month close to 440,000. This ranks with the record months of the earlier year.

Passenger car production in the United States was 379,111; 4800 less than April and 2000 less than March, the high months of the year. Truck production was 45,283, also the third high month of the year. Passenger car production in the United States for the first eight months totals 2,765,369 as against 2,431,202 in the same period of 1925. Truck production in the United States for the same period was 339,383 as against 305,503 in the 1925 period.

The August passenger car output represents an increase of 63,248 over July this year and of 163,024 over August, 1925. Truck production gained 5691 over July and 8889 over August, 1925.

Totals for the year up to date and by months for this year and for 1925 are shown in the adjoining column.

Miller Develops Stock to Improve Retreading

AKRON, Sept. 18—A new curing stock, which, it is said, enables the satisfactory retreading of pneumatic tires by vulcanization, has been announced by the Miller Rubber Co. Inability of car owners to secure mileage in proportion to the money expended on a retreaded carcass has caused a premature junking of many tires that would otherwise be economically salvaged. Failure in the past has been due, it is claimed, to the bulging and unequal flowing of the "Camel-back" curing stocks when used in a third circle mold. The new curing stock is claimed to produce a smooth job of uniform section throughout when used with conventional mold equipment.

Star Sets Economy Week

NEW YORK, Sept. 18—The Star Car Division of Durant Motors, Inc., announces that the week ending Oct. 16 has been designated as "Star National Economy Week, during which time every Star dealer in the country will be asked to stage a "100-mile economy run," with a Star four and a Star six. The company has prepared copy for window displays, banners and advertising.

OUTPUT FOR YEAR GROWS TO 3,259,838

WASHINGTON, Sept. 20.—Passenger car and truck production by months for the year to date and for 1925, with Canadian August totals estimated, are as follows:

	Cars	Trucks	Total
Jan.	213,851	28,203	242,054
Feb.	253,955	34,482	288,437
March	334,214	45,180	379,394
April	393,262	47,984	441,246
May	384,548	45,719	430,267
June	366,510	38,151	404,661
July	360,124	41,870	401,994
Aug.	223,517	37,850	261,367
Total	2,529,981	319,439	2,849,420
Sept.	274,227	60,482	334,709
Oct.	408,017	46,013	454,030
Nov.	337,435	40,048	377,483
Dec.	286,141	34,488	320,629
Total	3,835,801	500,470	4,336,271
Jan.	284,703	33,461	318,164
Feb.	334,524	41,685	376,209
March	399,105	49,233	448,338
April	401,836	53,887	455,723
May	394,569	51,343	445,912
June	358,365	47,070	405,435
July	328,816	41,847	370,663
Aug.	*391,861	47,533	439,394
Total	2,893,779	366.059	3,259,838

*Estimate including Canada.

Sharp Gain Shown in M.A.M.A. Report

NEW YORK, Sept. 22.—Strong fall business is reflected in the report of the Motor and Accessory Manufacturers' Association, just issued, which indicates that the upward trend started in August is being continued this month.

Remarkable gains over the July totals are shown by the index figures of the association covering various branches of the accessory and equipment business during August. The combined index figure, for shipments of original equipment, replacement parts, accessories and service equipment, with Jan., 1925, as a base, stood at 152, compared with 133 in July of this year.

The service equipment index stood at 166 in August, against 142 in July and 113 in August, 1925. Replacement parts figures respectively were 120, 117 and 130. Accessories stood at 131, 127 and 149, and original equipment was 157, 137 and 161.

Discontinues Reinsurance

NEW YORK, Sept. 20—New England Fire Insurance Co. has undertaken to discontinue its arrangement with Palmetto Fire Insurance Co. under which it was to take 60 per cent of the Chrysler business handled through the Palmetto company. A check has been forwarded to the Palmetto company representing the difference between premiums received for reinsurance and the losses and expenses which the New England company incurred.

Tire Check Shows All Stocks Lower

Increased Shipments and Lower Output in July Brings Inventories Down

NEW YORK, Sept. 20.—Shipments of all classes of casings and tubes in July showed important increases over June, with consequent reductions in stocks of manufacturers, according to figures submitted by the Rubber Association of America, Inc. Production during the month was generally lower than in June, only high pressure inner tubes and fabric pneumatic casings showing increases.

Inventory of balloon casings stood at 3,246,844 on Aug. 1 as compared with 3,348,039 a month earlier and with 1,775,428 on Jan. 1. Production was reduced to 1,918,251 as against 2,197,580 in June, and shipments increased to 2,037,276.

High pressure cord casings increased to 2,407,726 from 2,136,057, reflecting a turn in passenger car replacement market in which practically all of these casings are being sold. In July, 1925, shipments were 2,479,160 but at that time a considerable volume was still being shipped for car equipment. The casings inventory was reduced 699,824, production running 703,676 under shipments.

High pressure pneumatic casings showed shipments exceeding production by 218,083 with a drop of 230,826 in inventory. Shipments in July this year were 307,941 as against 809,290 in July, 1925, and production was 89,858 as against 447,145. Inventory was 893,611 as against 658,814.

Inventory of high pressure inner tubes was reduced 2,075,111; shipments exceeding production by 1,883,387. Inventory stood at 8,262,293 as against 4,677,647 Aug. 1, 1925. Total shipments were 4,310,981 as against 5,357,295 in July, 1925, and production was 2,427,594 as against 4,297,495. Both production and shipments exceeded the previous month.

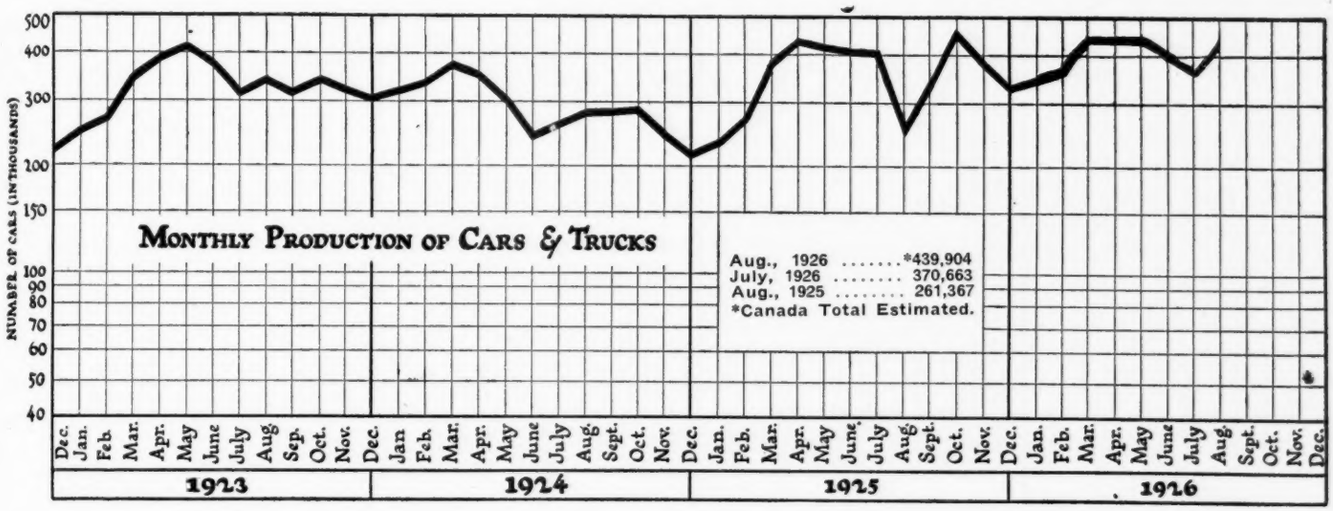
Balloon inner tube inventory decreased 157,769, shipments exceeding production by 246,662. Production during the month declined to 1,869,089 from the 2,465,646 June total and shipments increased to 2,115,751 from the June 1,993,353 shipping total. Inventories were 4,686,819 as against 4,844,588 the month previous.

Inventory of solid and cushion tires declined from 211,633 to 177,962, shipments being 47,294 as against production of 33,677. In June production was 42,294 and shipments 48,824. In July, 1925, production was 75,228 and shipments 74,715, inventory standing at 152,587.

Research Board to Meet

WASHINGTON, Sept. 15—The sixth annual meeting of the Highway Research Board of the National Research Council will be held December 2 and 3 in the National Academy of Sciences, National Research Building here.

August Production Near Record Mark



GM Sales Increase 334,932 in 8 Months

NEW YORK, Sept. 20.—With the addition of August's record establishing total of 134,231 sales to dealers, General Motors Corp. shows a total sale to dealers for all divisions in the first eight months of the year of 857,961. This compares with 523,029 for the same period in 1925, a gain of 334,932. Dealer sales to users in August of 122,305 brought total sale by dealers to 844,071 in the first eight months, comparing with 540,870.

Sales by months for the year and the two preceding years, are as follows:

Division Sales to Dealers

	1926	1925	1924
Jan.	76,332	30,642	61,398
Feb.	91,313	49,146	78,668
Mar.	113,341	75,527	75,484
Apr.	122,742	85,583	58,600
May	120,979	77,223	45,965
June	111,380	71,088	32,984
July	87,643	57,358	40,563
Aug.	134,231	76,462	48,614
8 mos. ...	857,961	523,029	442,276

Dealers' Sales to Users

Jan.	53,698	25,593	33,574
Feb.	64,971	39,579	50,007
Mar.	106,051	70,594	57,205
Apr.	136,643	97,242	89,583
May	141,651	87,488	84,715
June	117,176	75,864	65,224
July	101,576	65,872	60,836
Aug.	122,305	78,638	54,842
8 mos. ..	844,071	540,870	495,986

Vesta Buys WFKB Station

CHICAGO, Sept. 18—President Ward S. Perry, of the Vesta Battery Corp., announces that this organization has acquired the broadcasting station known as WFKB. The station is to be known as "The Vesta Battery Corp Station, WFKB, Chicago" beginning with the program at 7 P. M. Sept. 25.

Station WFKB has been operating for more than a year on 217.7 meters as an experimental station. It was off the air temporarily this summer. It is equipped with the latest transmitting apparatus and will be opened on 1000 watts. The Vesta broadcasting station will be on the air every week day evening from 7 to 10, Central time and on Sundays from 2.30 to 4 p. m.

August Rubber Imports Show 40.23 Average Price

WASHINGTON, Sept. 22—Preliminary figures compiled by the custom authorities and forwarded to the Rubber Division of the U. S. Department of Commerce, show that the August crude rubber imports totaled 28,133 tons, valued at $25,349,000—an average value of 40.23 cents per pound.

The figures show that crude rubber prices have dropped rapidly since last April. In that month the average import price was 62.99 cents, falling to 55.35 cents in May; 61.85 cents in June, and 41.20 cents for July. The Department of Commerce states that high priced rubber purchased under forward contracts has now mostly reached America and that monthly average prices should be subject to less fluctuation in the next few months.

Wilson Increases Output

MOLINE, Ill., Sept. 18.—Production of the Wilson Body Corp., which has been maintained at 10 bodies a day, goes to 15 daily next week and E. H. Wilson, president, has announced that plans to put the plant on a schedule of 25 bodies a day during the winter are under way. As the result of this schedule, necessitated through the receipt of orders from Stearns-Knight and other manufacturers, 100 men will be added to the present force of 500. The new men will reduce the overtime and night shift forces now employed.

Increase Capacity of National Gauge

LACROSSE, WIS., Sept. 20—Following acquisition of the controlling interest in the National Gauge & Equipment Co. by the Moto Meter Co., Inc., of New York, it was announced that contracts will be let at once for the erection of a one-story factory addition, 150 x 150 ft., at LaCrosse. This expansion, increasing the area fully 50 per cent, has been under consideration for several months to meet increasing requirements of National gauges and other devices for standard equipment.

Under the merger of interests, the Moto Meter company will transfer part of its Long Island City operation to LaCrosse to relieve the pressure of orders for the Moto Meter. The addition at LaCrosse will be ready late in December and in production to meet the heavy shipping specifications of car manufacturers immednately after Jan. 1.

P. M. Gelatt remains president of the LaCrosse concern, and there will be no changes in policies and personnel, save the addition to the working force when the plant expansion is completed.

Wesley Steel Adds Unit

MILWAUKEE, Sept. 20—In order to handle the steadily growing volume of business from the automotive and machinery industries generally, the Wesley Steel Treating Co. has started work on the erection of a shop addition materially increasing its capacity. With equipment the addition will cost about $50,000.

Rajah Changes Title

BLOOMFIELD, N. J., Sept. 18.—Stockholders of the Rajah Auto Supply Co. at a recent meeting here, resolved to incorporate under the laws of New Jersey as The Rajah Co. The change is already effective. Ownership, management and officers remain the same.

Dodge Brothers Now Has 5-Bearing Shaft

Changes Include 2-Unit, 6-Volt Electrical Equipment and New Steering Assembly

NEW YORK, Sept. 21.—Improvements in the Dodge Brothers car as disclosed by a survey of cars now on display in dealer salesrooms, include five-bearing crankshafts, air cleaners, two-unit, six-volt electrical equipment and new steering assemblies. In addition, all models have new type choke control and ignition switch, and the closed models are fitted with an improved door lock. A number of detail refinements also have been made in the de luxe sedan and sport open jobs. In line with this manufacturer's policy of "constant improvement but no yearly models," these improvements have been incorporated in production without change in model.

Increased smoothness and reduced rate of wear are secured with the new five-bearing crankshaft which is machined all over and has approximately one-third more main bearing area than the former three-bearing design. The new shaft is approximately ten pounds heavier and the section of the cheeks is larger, giving greater stiffness. Connecting rods are interchangeable with those used on the three-bearing engine.

The air cleaner is a United and is mounted on the forward end of a cast jacket secured to the side of the exhaust manifold. Each end of this jacket is connected by a pipe to the cross tube leading to the carburetor on the opposite side of the engine and passing between cylinders two and three. A valve is located just below the cleaner so that the entering air may be passed through the jacket or sent direct to the carburetor as operating conditions demand.

Obtains Quieter Operation

North East two unit, six-volt electrical equipment has replaced the single unit, 12-volt system formerly employed. This change is said to have been made primarily to secure quieter operation at the higher average engine operating speeds encountered at the present time. The generator has third brush control and is strap-mounted in a saddle cast on the side of the crankcase in substantially the same position formerly occupied by the distributor-coil assembly. The generator is driven at crankshaft speed through two flexible couplings from the rear end of the pumpshaft. Drive for the distributor, which is mounted on the right at the front of the engine, is through helical gears from the pump-shaft while the coil is now mounted on top of the cylinder head at its forward end. The starting motor is mounted on the flywheel housing at the left and engages through a Bendix drive, the reduction ratio being 12 to 1. The battery is a 13-plate, 111-amp. hr. Willard.

Improvements in the steering assembly include the adoption of a worm and sector type of gear with 10 to 1 reduction in place of the former worm and wheel design with 8 to 1 ratio. The steering shaft is now a seamless steel tube of slightly larger diameter than the solid shaft formerly employed, giving increased strength and rigidity. Use of the tubular shaft permits removal of the spark and throttle rods from their former position thus improving appearance and eliminating noise. Spark and throttle levers are now of the conventional short level type mounted above the wheel and are made of aluminum.

Ignition Switch Has White Face

The new ignition switch has a white face with the various positions lettered in black. No lock is provided on this switch as transmission locks have been regular equipment for some time past. In the choke control formerly used, spring pressure acting against grooves or notches in the plunger was employed while in the new design friction is depended upon to hold the plunger in the desired position, thus eliminating noise from this source. Outside of the use of white instead of black dials on the instruments, there are no other changes in the instrument board except on the de luxe sedan and sport touring and roadster jobs, which have the speedometer, ammeter and oil gage grouped in a panel under one glass. The background of this panel is white and it is indirectly illuminated by a light controlled by a switch above the panel. These three models also have bullet head and cowl lamps and wood spokes in the steering wheels which are finished in walnut to match the other fittings.

Door Lock Design Changed

As a result of the change in the door-lock design, much easier operation is secured. Formerly, a long, U-shaped rod, looped down below the position occupied by the glass when in the lowered position, connected the outside door handle with the lock proper which is on the inner surface of the door. This rod is eliminated in the new design and in its place there is a shaft and lever construction which gives proper operation with much lighter pressures.

Two Custom-Body Models Added on Jordan Light 8

CLEVELAND, Sept. 20—Two new body models known as the Custom Line and listing at $2190 have been added to the lighter series "J" eight-cylinder chassis, it is announced today by the Jordan Motor Car Co. These two five-passenger bodies, a Victoria and sedan, the latter being of all steel construction, are offered in special color combinations, elaborate upholstery and provided with a new instrument board. A trunk, without suitcases, is standard equipment on the two-door Victoria model.

The other three body models forming the "J" line and the two bodies on the "AA" chassis are continued without change.

GMC to Show Cars in Detroit Exhibit

Exposition Hall in Corporation Building to be Center of Special Showing

DETROIT, Sept. 20.—General Motors Corp. will present a complete showing of its entire line of motor cars at the General Motor Building, in Detroit, Oct. 9 to 16. Simultaneous with the big display, 200 dealers and distributors within a radius of 50 miles of Detroit will prepare special exhibits in their respective showrooms.

The big exhibit will be held in the mammoth exhibition hall on the fourth floor of the building and will be supplemented by the Cadillac National Salon in the auditorium on the first floor, besides a motion picture show which will be given on floor 15.

The complete lines of Chevrolet, Pontiac, Oakland, Oldsmobile, Buick and Cadillac, with Pontiac and Chevrolet commercial vehicles, Hertz Drivurself cars, Yellow taxicabs and trucks and G. M. C. trucks will comprise the exhibit.

The event will mark the first occasion where General Motors Corp. has brought all its products together for an exclusive showing under one roof in this section. Plans for the exhibition were inspired by the unusual success which has been enjoyed by the permanent exhibit of General Motors products at Atlantic City.

A total of 70 different models of passenger cars ranging in price from $510 to $4350 will be displayed in the main exhibition hall. Seventeen models of trucks, commercial cars and taxis will be shown in the wells leading to this hall. In the first floor auditorium, 30 Cadillacs ranging in price from $2995 upwards, will be shown, while additional models will be displayed in the first floor showrooms of the five divisions.

New Puncture-Proof Tube Withstands Federal Test

WASHINGTON, Sept. 21—An automobile tire with inner tube immune to perforation by nails has been perfected, according to the Rubber Section, Bureau of Standards, which has been testing a product of a manufacturer with nails of varying size and under varying conditions. The tests were made at the request of a Federal Department which doubted the manufacturer's claims.

The inner tube of the puncture-proof tire contains a chemical compound or liquid which performs the function of instantly repairing any perforation made by a nail, the testers declared. It is believed that an unusually large nail would cause a permanent puncture, but such nails are not immediate dangers in regular service of automobiles.

The tests are the first to be undertaken by the Bureau in connection with puncture-proof pneumatic tires.

Large Orders Make Steel Outlook Good

Coverage Extends Through October But Much Late Year Buying Expected

NEW YORK, Sept. 23—With a very comforting quota of automotive orders on their books, steel producers are more at ease as regards the outlook over the remainder of the year. On the whole, it is thought that October requirements of motor car and parts manufacturers are fairly well covered, but that considerable buying for November and December remains to be done. Some consumers are covered for from six weeks to two months, but there are also those who must place additional orders to carry them through October. Anticipation of recent advances in the sheet market served to bring out considerable business that otherwise in all probability would have dragged along for some time to come. Possibly with the same object in view, some sheet rollers are again predicting further upward price changes this week. Non-integrated rollers, when they sought lower sheet bar prices, were told that, rather than depress the price for their raw material, they should strive to get a better figure for their finished product. Inasmuch as there is little likelihood of sheet bar mills changing their attitude, further efforts to obtain better prices from sheet consumers may be looked for, provided, of course, that the volume of demand supports this stand of sellers.

While the new base for gages has met with almost general adoption on the part of sheet manufacturers, not all look upon the change as having been of real benefit in equalizing production costs, and not a few consumers still show hesitancy in committing themselves for large tonnages on the new basis. Every day brings nearer the inevitable buying of steel rails by the railroad companies, and when the negotiations now pending are finally consummated, much publicity for these strictly routine transactions may be looked for, the object, of course, being to create an impression of unusually heavy steel demand, when, in fact, the carriers are merely contracting for their annual quota of rails.

Fourth-quarter bolt and nut contracts are being placed by automotive consumers at previously prevailing discounts. Movement of steel from Western Pennsylvania and Ohio rolling mills is being greatly expedited by special freight service that places cars on the sidings of Michigan automotive plants within 48 hours after they have been picked up at steel mill sidings.

Pig Iron—An isolated instance of a contract placed by an automotive foundry at 50c per ton over the going market price, so as to insure shipments during the first quarter of 1927, has caused no general buying movement for that deferred maturity. Blast furnace interests, while unanimous in the belief that any market change must be in an upward direction, are satisfied to take current business at old prices, but some are rather reluctant to quote 1927 prices, believing that patience until demand develops more generally is the better policy.

Aluminum—The conviction is gaining ground that the greatly increased world output that must be looked for, when expansion under way in Canada, Norway, Great Britain, and Germany bears full fruit, will be readily absorbed by the broadening of duralumin demand for air-craft of all sorts, and that aluminum producers are really preparing against the day of much quickened aeronautical construction which they sense to be just around the corner. Imports are lighter and bonded stocks on the downtrend. Prices are unchanged.

Copper—Automotive demand for wrought copper and brass products is encouraging, and the outlook over the remainder of the year bright. The copper market is easy.

Tin—Following skyrocketing of prices, the tin market looks tired and slight reactions are in order.

Equipment to Draw Service Men to Show

NEW YORK, Sept. 18—The plan to provide special sections for service equipment at the National Automobile Shows has been well received by representative men in the industry, according to letters received by the Motor & Accessory Manufacturers Association and the National Automobile Chamber of Commerce.

Among the first of the motor car manufacturing executives to express their approval were Charles Clifton, chairman of the board of the Pierce-Arrow Motor Car Co.; Charles D. Hastings, president, Hupp Motor Car Corp.; A. G. Brosseau, president, Mack Trucks, Inc.; and L. G. Peed, sales manager, Willys-Overland, Inc.

W. M. Warner, of the Cadillac Motor Car Co., a member of the service committee of the N. A. C. C., said he had observed "that attendance of service managers at the show had been growing each year and with the added attraction of the shop equipment sections it ought to be practically 100 per cent. This will hold true also with respect to all service managers and dealers within 200 or 300 miles of New York and Chicago."

NSPA Catalog Plan Ready

DETROIT, Sept. 18—National Standard Parts Association has just issued a revised edition of the booklet entitled "N.S.P.A. Catalog Standards." Copies of this standards booklet are available to all manufacturers of replacement parts, in order that its adoption will make it possible to supply their jobbers with catalog sheets of uniform size, and printing specifications. This will enable the jobbers who assemble catalogs for distribution to their trade, to use the manufacturers' sheets, and bind them between covers of their own selection without the necessity of trimming pages, and sometimes resetting type, in order to obtain a book of uniform page size. Manufacturer and jobber economies are thus insured.

A.E.A. Establishes Dealer Show Night

Former Exclusive Wholesaler Show Thrown Open to Display Products for 1927

CHICAGO, Sept. 20.—"Dealers' Night" will be one of the innovations to be introduced at the Automotive Equipment Association show in the Coliseum at Chicago the second week of November. Heretofore the show attendance has been limited to members of the association and a few jobbers and representatives of foreign automotive establishments who were invited to attend.

At this year's show, however, Tuesday night, Nov. 9, has been set apart so that car distributors, dealers, accessory retailers and others may have the opportunity of participating in this first showing by the A.A.E. manufacturers of their 1927 merchandise, including accessories, shop equipment, replacement parts, small tools, supplies, etc.

Admission tickets for "Dealers' Night" will be issued by the A.E.A. and furnished to the jobbing members of the association in all parts of the United States and Canada, who in turn will distribute them to those retail customers who desire to attend.

Purchases Through Mails Brings Federal Charge

CHICAGO, Sept. 29.—Indictments have been returned in United States District Court here against three defendants charged with having used the mails for the purchase of materials to manufacture counterfeit Boyce Moto Meters.

The alleged scheme to defraud was that the defendants having planned to manufacture counterfeit Moto Meters ordered materials from various reputable concerns which were to be assembled into completed counterfeit Moto Meters and thereafter to sell them to the trade as genuine Boyce Moto Meters. The materials having been so obtained, the indictment charges, several thousand instruments were actually manufactured and sold as genuine Moto Meters.

The case is unique in that this is the first time the Government has given attention to users of the Post Office in furtherance of a scheme to sell counterfeit motor devices. The case will be pressed to trial and similar action is planned in the case of any others guilty of similar practices.

Stutz Pikes Peak Winner

INDIANAPOLIS, Sept. 17—Driving a Stutz Special, Glen Shultz won the famous Labor Day hill climb of Pike's Peak in 18 minutes 19½ seconds, which is considered remarkable time in view of the fact that the upper curves had been blanketed with snow the day before the race. The victory carries with it the Penrose Trophy and $1500 in cash.

Further Duty Cuts Probable in Canada

Liberal Government Sees Further Business Increases Rising Through Reductions

OTTAWA, Sept. 21.—The high-protectionist Conservative Government in Canada formally resigned Sept. 21, after a tenure in office since last June, following the general elections in which the low-tariff Liberals turned the tables, thanks to their budget last April, in which substantial reduction in the import duties on automobiles was the principal feature. "More Robb Budgets," was the election cry on the Liberals and the promise of further taxation relief is undoubtedly what spelled the downfall of the Conservatives who were freely charged with being allied with the manufacturers. As the Liberals enjoy the support of the third party, the Progressives, who are admittedly free traders, it is freely predicted that the Liberal administration will hold office for the next five years or more.

Right Hon. Mackenzie King, Liberal leader, in a declaration, pointed out that the reduction in automobile duties had not killed the Canadian automotive industry, but, on the other hand, resultant lower prices had broadened the market to such an extent that the Canadian factories were never so busy as at present. Still further tariff reductions would bring more Canadian business, he said.

In order to insure support from the progressive party groups, the Liberal Government will listen to their requests for lower tariffs, it is believed.

A peculiar angle to the situation is that the city of Oshawa, a leading automobile manufacturing center of Canada, again returned a Conservative to Parliament in spite of the fact that the Liberal leader was accorded a wonderful reception there on the eve of the recent elections. Toronto, Windsor, Hamilton and other automobile industrial centres also voted strongly Conservative, but their representatives will be on the opposition side of the House of Commons.

Timken Entertains S. A. E.

CANTON, OHIO, Sept. 18—The Timken Roller Bearing Co. was host to more than 100 members of the Cleveland section of the Society of Automotive Engineers in Canton Thursday. From all over the district came members of the society who were met by plant executives conducted through the many departments, witnessing the process of making Timken bearings.

Following the inspection tour and talks by company executives the visitors were taken to Congress Lake club where lunch was served. A blind golf tournament was the feature of the afternoon, with all kinds of outdoor sports on the program. There was also a bridge tournament. Prizes were awarded winners of the various events.

ARMY TO REPLACE ALL WAR-TIME CARS

WASHINGTON, Sept. 21—Practically all of the war-time motor transportation of the Army is in need of replacement, and the quartermaster general's department will shortly be a large purchaser of motor cars, the War Department has announced.

Preliminary specifications have been submitted by the War Department to 15 manufacturers, in an effort to determine if there is available a suitable five-passenger car for adoption as a standard throughout the Army.

Acceptance of 148 motor vehicles, scheduled for delivery at Camp Holabird, Md., last month has been held up because of failure of the manufacturers to live up to certain specifications, particularly with reference to the quality of the engine valves.

Bauer Reports Success of European Journey

NEW YORK, Sept. 18.—George F. Bauer, secretary of the Foreign Trade Committee of the National Automobile Chamber of Commerce, is receiving splendid cooperation and gathering much information on European automotive conditions in his tour of the continent, according to word received by the N. A. C. C. Swedish motor interests have been especially helpful in assisting Mr. Bauer to meet with the automotive groups in that country, where he has spoken before the Royal Automobile Club and the Stockholm Dealers' Association.

Mr. Bauer is making a special study of foreign merchandising procedure and at the same time has been disseminating information on automobile financing, traffic control and regulation.

McKinnon Chain Convenes

TOWANDA, N. Y., Sept. 17—The Columbus McKinnon Chain Co. held a joint convention here recently of the automotive department and industrial chain division. Headquarters were at the Niagara Hotel, Niagara Falls, and sales sessions were held at the Tonawanda plant. Sales policies were reviewed and new merchandising ideas were presented under the chairmanship of Don S. Brisbin, general sales manager and Warren J. Shay, sales manager of the automotive division.

American Electric Builds

MILWAUKEE, Sept. 20—A new plant with an area of 30,000 sq. ft. in its first unit, will be built immediately by the American Electric Motors, Inc., on a new site at Cedarburg, Wis., north of Milwaukee. Contracts were awarded Sept. 10, and work is being pushed so that the new plant may be in operation by the close of the year.

Still Smaller Car May Follow Whippet

Willys Tells British Company is Prepared to Meet European Demand

NEW YORK, Sept 21.—To meet European demand for even smaller and lighter automobiles, Willys-Overland Co. may in the future produce a still smaller car than the Whippet, John N. Willys, president of the company, said in formally introducing the Whippet to the British trade in London. In the meantime, the company will concentrate on the Whippet, he said.

Mr. Willys said that in view of the British inclination to purchase only British goods that a good deal of the material to be used in the manufacture of cars in the Willys-Overland Crossley Ltd. at Manchester probably will be supplied from Canada until such time as production can be made as nearly 100 per cent British as possible.

The company hopes to increase its business largely in France in 1927, Mr. Willys said. "We will sell this year something like 400 cars here and we plan to sell in 1927 at least 2000 to 3000 cars," he declared.

"The United States should not stand aloof from Europe but should make it financially possible for Europeans to absorb our exports," Mr. Willys asserted. "Our tremendous producing power in America, our great resources and huge population make it possible for us to produce on a mass production principle, such as no other country is able to do. We want to export our manufactures and it would be wise to make it financially possible for England to buy."

Elgin Machine Adds Plant

Elgin, ILL.—Sept. 18—The Elgin Machine Works, makers of "Elgin Quality piston pins, is constructing a new plant here which will cost $50,000 and give the company much more commodious quarters than it now occupies. The Elgine Machine Works was incorporated in 1920 since which time it has enjoyed a steadily growing business. It is producing about 1,500,000 piston pins annually, production averaging about 5000 a day.

Mohawk Sales Continue

AKRON, Sept. 18.—Sales and earnings of the Mohawk Rubber Co. during August exceeded any previous month in the company's history, it was announced today by H. H. McCloskey, secretary and comptroller. Although the plant was operated at capacity, demand from dealers for Mohawk products was so great that many orders could not be filled. If production had kept up with actual orders, sales in August would have been $200,000 more, officials say. Current production is approximately 1500 tires and 2000 tubes a day.

Railways Make Gain as Car Total Grows

New York Central Head Says Compensations Exceed Short Haul Losses

TOLEDO, Sept. 20—With the growth in automobile travel over short distances, President P. E. Crowley, of the New York Central lines, finds that what the larger railroad systems have been losing in short haul business they are making up in other services. Speaking before the Chamber of Commerce here he said the growth of long distance travel between the great commercial and manufacturing centers has been accelerated since the introduction of the automobile.

Mr. Crowley said further:

"Passenger traffic, however, represents only about one-quarter of the business of the railroads. When we examine the freight traffic returns we find that the volume of freight service is now four times what it was thirty years ago, and double what it was twenty years ago. It has increased 50 per cent since 1914, during this same period which has seen the putting into use of 20,000,000 motor vehicles.

"American railroads are carrying today the greatest volume of traffic in their history, and no small part of this record traffic is due to the demands of the automobile and its allied industries. What they have lost to the automobile in short-haul passenger business they have much more than made up in freight service for the industry.

"That there is growing competition between railroads and automobiles in the transport of both freight and passengers is not to be denied. How could there escape being some competition when, for every railroad passenger car in the country there are 500 passenger automobiles; and when there are as many motor trucks as there are freight cars? And, I might add, when we have only 250,000 miles of railways as compared with 3,000,000 miles of public highways, maintained out of public taxes, of which the railroads, by the way, pay $360,000,000 a year.

Now Nation of Travelers

"The American people have become a nation of travelers such as the world has never before seen. The farmer, who formerly seldom journeyed beyond the nearby market town, now considers he is not getting good use of his automobile if he does not cover several thousand miles a year. Workers in the industrial cities spend their summer week-ends exploring the country highways. The horizons of all our people are being broadened. Sectional barriers are disappearing.

"And while the volume of travel has been enormously increased, there has been, it is true, a temporary decline in the use of steam railroads, especially for short-distance journeys. I say temporarily because I am convinced, from our own experience on the New York Central, that the automobile, by stimulating the desire to travel, and this greatly enlarging the market for travel service of all kinds must eventually produce more railroad travel, especially long-distance travel.

"Since 1914, it is to be noted, some 20,000,000 motor vehicles have been brought into use. Measured in passenger miles, they are performing a much greater volume of passenger service than the railroads. It is estimated by our friends in the automobile industry that motor vehicles this year will produce close to 100,000,000,000 passenger-miles of transportation, as compared with 36,000,000,000 on railroad trains."

1929 Road Congress to be Held in U.S.

WASHINGTON, Sept. 15—Definite assurance that the United States will be the scene of the meeting of the International Road Congress, in 1929 was given the American delegation during the closing session of this year's meeting at Rome, according to cable received by the U. S. Department of Commerce from Pyke Johnson, of the National Automobile Chamber of Commerce and one of the government's accredited delegates to the present Road Congress.

The Congress brought together over 2000 representatives from 50 countries and five continents. The Congress just concluded was the first at which the United States has been officially represented. The American delegation will leave for the United States on Oct. 12.

S. A. E. Holds Frolic

NEW YORK, Sept. 18—The Metropolitan Section frolic of the Society of Automotive Engineers was held at the Manhasset Bay Yacht Club yesterday. About 200 members attended. The frolic committee included J. M. Grant, L. E. Vogt, S. H. Woods, W. J. Sommers, S. R. Milburn, W. E. Kemp and G. A. Round. The reception committee included H. M. Rugg, J. M. Anglada, A. C. Bergmann, C. E. Heywood, W. S. Marsden and A. F. Wagner.

Arrangements were made by officers of the Metropolitan Section, who include F. K. Glynn, chairman, C. B. Veal, vice-chairman, E. F. Lowe, treasurer, and H. M. Rugg, secretary.

Monkey Link Patent Upheld

PHILADELPHIA, Sept. 20—In a decision by Judge Buffington in United States Circuit Court of Appeals the patent on the "monkey link" for repair of anti-skid chains was upheld. Edward F. Slattery and Peter J. Nagle were the plaintiffs-appellants and Walter D. Godfrey, trading under the name Self-Closing Link & Chain Co., defendant-appellee. An accounting in favor of the plaintiffs was ordered in conjunction with the establishment of the validity of the patent.

High Summer Sales Keep Car Stock Low

Reduction of 60,000 Made in July—Sales Gain Exceeds Production Gain

PHILADELPHIA, Sept. 21—According to one statistical agency compiling new car sales figures from registrations, 356,544 passenger vehicles were sold during July, representing an increase of about 7½ per cent above June. Over a period of years July has shown an average increase of less than 1 per cent over the preceding month so that this year's record may be considered as particularly favorable.

Retail sales during the first seven months of this year amounted to 2,138,847 passenger cars as compared with 1,876,582 in the corresponding period of 1925, a gain of 14 per cent.

A decrease of approximately 60,000 cars in new car stocks is indicated by the July sales and production figures. Total output in the United States in that month was 315,861 which, after exports of 17,077 are deducted leaves a balance for domestic sale of 298,784.

Although production was maintained at a high rate during the first seven months of the year, the increase over 1925 was only 9 per cent and, in view of the 14 per cent gain in sales, seems now to have been largely justified. If new car stocks were at all above normal at the beginning of the second half of the year, the 60,000 drop in July should have corrected the condition. The statistical evidence certainly indicates that a sound relationship exists between stocks and prospective sales.

Seek General Bus Ticket

CLEVELAND, Sept. 18—In order to reduce fares for traveling salesmen and other regular patrons, six motorbus companies have asked the public utilities commission for permission to issue interchangeable mileage books. The lines are the Cleveland-Ashtabula-Conneaut Bus Co., Cleveland-Elyria-Toledo Bus Co., Warren-Salem Bus Co., Cleveland-Mahoning Valley Coach Co., Pennsylvania-Ohio Coach Lines Co., and the Akron-Youngstown Bus Co.

Mexico Connects With Air Mail

WASHINGTON, Sept. 18.—According to an announcement made by Postmaster General New, the Mexican Post Office Department has made arrangements with the United States Post Office Department to connect with the contract air mail line service between Fort Worth, Texas and Chicago, letters to Mexico being handled as special delivery letters with out extra charge. The complete itinerary between New York and Mexico City calls for a total time in transit of 81 hours and 20 minutes and between Mexico City and San Francisco 92 hours.

Men of the Industry and What They Are Doing

Schwab Presents Outline for Merger of Speedways

ALTOONA, Sept. 21—At a meeting here last Friday of managers and stockholders of five board automobile speedways in the eastern part of the country and under sanction of the American Automobile Association, plans were formed for amalgamation into one large organization.

Promoters of the speedway project hope to merge the speedway associations of Altoona, Charlotte, Atlantic City, Salem, N. H., and Laurel, Md., others might be brought in later.

Representatives of four of the eastern tracks attended the preliminary conference, held in this city last week. Charles M. Schwab, organizer and heavy stockholder in the Amatol track at Amatol, near Atlantic City, N. J., called the session and is taking the leading part in the merger movement, which so far is in the preliminary stage, due to reluctance of one or two of the associations.

By merging the five speedway organizations and purchasing all of the stock, it is planned by the promoters to have a concern better able to promote speed events. The new arrangement will provide for one organization instead of individual organizations as at present. It is hoped by the promoters eventually to put the gigantic speedway association on the New York stock markets.

Nothing definite resulted from the conference here last week, several of the associations manifesting the desire to continue independently. Several of the tracks are making money, notably Altoona and Salem, with two others breaking even and Laurel a failure to date.

The taking of valuations of each of the five tracks, percentages estimated and the issuance of common stock were among the phases discussed at the conference here.

If an organization controlling the five eastern board tracks transpires, efforts will then be made to enroll the board speedway associations of Miami, Fla., Fresno and Los Angeles, Calif. The Indianapolis brick track association is not being considered in the deal, according to present plans.

Lockhart Sets New Mark in Altoona 250-Mile Race

ALTOONA, PA., Sept. 20—Frank Lockhart wheeled a Miller-owned race machine to first place in the 250-mile Altoona speedway race, Saturday, breaking the Altoona and world's "baby motor" records.

Lockhart rolled off laps averaging 119 miles an hour to reach the lead and he maintained a steady pace throughout, finishing with an average of 117 miles an hour. At the finish Lockhart was just four laps ahead of Kreiss and almost five ahead of Duray, both of whom had Miller front-drive cars.

VILLIERS TO BUILD NEW BRITISH SIX

LONDON, Sept. 11.—(*by mail*) —The production of a distinctive two-liter six-cylinder sedan capable of being driven thousands of miles without attention by owner-drivers is the aim of the Villiers Engineering Co., Ltd., Wolverhampton. No attempt is to be made to compete with the inexpensive American sedan six.

It is not anticipated that the Villiers will be on the market before next spring. The makers have had a wide experience in the production of engines and automobile parts, but this is their first venture in the complete car field.

Eighteen drivers participated in the race, which was the seventh to be held on the local track. Ten cars finished. Eight withdrew due to motor troubles. Three other machines, in charge of Pete DePaolo, Ralph Hepburn and Dave Evans, respectively, failed to qualify.

Lockhart finished the 250-mile course in 2 hours, 8 minutes and 13.92 seconds, a new world's record for the 91½ cubic inch motors. His victory gave him $10,000 of the $25,000 purse and 500 points toward the A. A. A. race drivers' standing. Kreiss, as second winner, received $5000 and 260 points. Duray was awarded $2500 and 140 points.

The other seven finished as follows: Fourth, Harry Hartz, Miller; fifth, Bob McDonogh, Miller; sixth, Fred Comer, Miller; seventh, Anthony Gullotta, driving for Bennie Hill, from 159th lap, Miller; eighth, Frank Elliott, Miller; ninth, Eddie Hearne, Locomobile, Jr. 8; tenth, Dr. W. T. Shattuc, Miller.

The cars that were forced out of the race and their respective troubles, follow: Woodbury, Boyle Special, out 34th lap, dropped valve; Lewis, front wheel drive Miller, out 55th lap, gas line broken: Cooper, Millerfront wheel drive, out 41st lap, broken valve; Batten, Miller, out 22nd lap, general motor trouble; Fengler, Locomobile, Jr. 8, out 114th lap, general motor trouble; Lecklider, Miller, out 111th lap, broken gas line; Gulotta, Miller, out 48th lap, general motor trouble; Devore, Altoona nickel plate special, out 120th lap, engine completely disabled.

Thompson Goes Abroad

C. S. Thompson, manager of the foreign sales department of Four Wheel Drive Auto Co., Clintonville, Wis., will sail October 2, for a business trip which will occupy several weeks' time in Europe, after which he will go to Brazil and the Argentine.

Pittsburgh Steel Products Names Blair Sales Manager

John R. Blair has been appointed manager of sales of Pittsburgh Steel Products Co., Pittsburgh, succeeding Chas. F. Palmer, resigned. For the past eighteen years Mr. Blair has been connected with the sales department of the Pittsburgh Steel Products Co., and its predecessor the Seamless Tube Co., of America, and for several years has been acting as assistant to the general manager of sales.

M. "Jack" London has been appointed manager of the Detroit office of Pittsburgh Steel Products Co., and will assume his duties there October 1.

W. A. Smith with duPont

W. A. Smith has been appointed sales manager of duPont Motors, Inc., by L. F. Hosley, general manager. Mr. Smith was formerly vice president and sales manager of Mercer Motors Co., of Trenton, N. J., and is well acquainted in the field in which duPont Motors operates. In making this announcement, Mr. Hosley said: "This is another step in the carrying out of an aggressive program of marketing a newly developed line of custom built motor cars."

Wilkins Production Chief

Karl Schreiber, superintendent of the Springfield works of the International Harvester Co., has appointed R. M. Wilkins production manager succeeding J. W. Phillips, who has been transferred to the Tri-City works as assistant superintendent. Also that Clarence Molitor will be assistant production manager at the local works. P. O. Cook will succeed Mr. Wilkins as inspection engineer.

Velie Names Sales Directors

J. S. Malchow has been appointed northwest district manager for Velie Motors Corp. and will take charge of the company's dealer expansion program in this section. Louis Woods has been given charge of sales in the southwest district with headquarters at Dallas. Mr. Woods was formerly with Buick Motor Co. and the Armleder Motor Truck Co.

Resigns as Air Mail Chief

Stephen A. Cisler, of Denver, Colo., has resigned as general superintendent, Air Mail Service, effective Oct. 1, and D. B. Colyer, of Bement, Ill., now assistant general superintendent, will be promoted to Mr. Cisler's place, Postmaster General New has announced. Alvin E. Peterson, of New York city, now assistant superintendent of contract air mail, will take Mr. Colyer's place.

Grandjean Back in Detroit

Philip W. Grandjean, secretary of the Ford Motor Co. of Canada, has returned to Windsor following an extended business and pleasure trip to Quebec City.

Rickenbacker Plans Early Reorganization

DETROIT, Sept. 21.—Plans for a reorganization of the Rickenbacker Motor Co., which will bring into the company additional working capital, are to be announced publicly within ten days, according to President B. F. Everitt. The personnel of the company will be considerably changed under the reorganization following the resignations of E. V. Rickenbacker, vice-president, and E. Leroy Pelletier as advertising manager.

In announcing his resignation, Captain Rickenbacker said he planned to enter actively into the aviation field in which he has numerous interests. He will continue his personal holdings in the Rickenbacker company. Mr. Pelletier will concentrate his attention upon his real estate holdings. His retirement takes from the advertising branch of the industry one of its best known figures.

Both men, like most of the officers of the Rickenbacker company, were large personal owners of its stock. The company as conceived by Mr. Everitt and H. L. Cunningham was built around the personality of Captain Rickenbacker and the large personal following he established as a racing driver and later as leading flyer of the American air forces.

At the outset practically all of the stock of the company was held by its officers and friends of the organization like Walter E. Flanders. Some time later the stock was made available for general purchase. A minority interest was purchased about a year ago by Noyes & Jackson, bankers.

Losses incurred through building bodies for other car companies in its Trippensee property reduced the company's working capital.

Gardner Shows 20% Gain

ST. LOUIS, Sept. 20.—Gardner Motor Co., Inc., reports an increase of 20 per cent in sales over the same month last year with indications of further. Retail sales are reported by the company as large, especially in metropolitan centers where several of its special models have won great popularity. Dealer stocks are low and in some instances deliveries to owners are delayed pending arrival of shipments.

Hudson Body Plant Lowers Quarter Net

DETROIT, Sept. 20.—Hudson Motor Car Co. reports a net income of $1,926,645 for the quarter ended Aug. 31, after depreciation, Federal taxes and other charges, which is equal to $1.20 a share on the 1,596,660 shares of stock. This compares with net income of $3,311,314 or $2.49 a share in the preceding quarter and with $6,926,554 or $5.24 a share in the August quarter last year.

For the nine months to Aug. 31 the net reached $7,983,982 or $5 a share as against $16,722,269 or $12.66 a share in the same period last year.

Officers of the company ascribe the diminished returns to the cost of introduction of new models in both the Hudson and Essex lines during the past quarter and to the initial charges incident to the opening of its plant for manufacture of all-steel bodies.

Chandler Orders at Peak

CLEVELAND, Sept. 20.—Chandler-Cleveland Motors Corp. reports a 60 per cent sales increase in August over any previous August in its history and a larger total of unfilled orders than at any previous time. The dealer organization also has been increased 63 per cent since August, 1925.

Ireland Buys More Trucks

DUBLIN, I. F. S., Sept. 3. (*By Mail*)—During the first six months of 1926 the Irish Free State imported 120 commercial vehicles, the total value being £46,539. In the corresponding period of 1925, 91 trucks (value £23,490) were imported.

Financial Notes

Thompson Products today declared a 25 per cent stock dividend payable Oct. 1 to stock of record Sept. 20. In addition the board declared a quarterly cash dividend of 3 per cent to be paid on the old stock plus the amount issued as a stock dividend. This is payable Oct. 1 to stock of record Sept. 20. Fractional shares will be paid in cash at par $100. In the six months ended June 30 the company earned about $21 per share on the $1,946,100 of common stock.

General Motors Corp. reports a total number of common and preferred stockholders for the third quarter of 1926 as 47,805 compared with 53,097 in the second quarter and with 58,118 in the third quarter last year. This is the smallest number of stockholders since the fourth quarter of 1920 and indicates a concentration by larger buyers.

Midland Steel Products will pay the $12 rate on preferred and same extra on common. The extra of 20 per cent on common amounted to 49 cents per share making the present distribution $1.49 the same as paid three months ago. A dividend of $2 regular and $1 extra was declared on preferred all payable Oct. 1 to stock of record Sept. 23.

E. I. DuPont de Nemours & Co. directors have taken steps to issue and distribute the new no par value stock in exchange for the present outstanding $100 par value stock. The exchange will be made late in October, the exact dates to be set later.

Pratt & Lambert, Inc., directors have declared the regular quarterly dividend of 75 cents on the no-par value common stock, payable Oct. 1 to stock of record Sept. 15.

C. G. Spring & Bumper Co. will pay its regular quarterly dividend of 2 per cent, Oct. 1, to stock of record, Sept. 24.

Chandler-Cleveland Motors Corp. declared regular quarterly dividend of $1 on preferred, payable Oct. 1, to stock of record Sept. 20.

Norwalk Tire & Rubber Co. has passed the quarterly dividend of 20 cents on the common, due Oct. 1.

Developments of the Week in Leading Motor Stocks

NEW YORK, Sept. 23.—General market unsettlement has been reflected in the trend of automotive stock prices. The only real strength in the last week or so has been displayed by General Motors, the others, with the exception of a few fractional advances, showing losses of several points in some instances.

Motors, at around 155, was selling at the equivalent of 227 for the old stock before the dividend. The rapid rise was apparently not due to any unusual developments in the financial position of the big producer, but was accompanied by rumors of another extra cash dividend, to be declared at the next meeting of the board of directors. Wall Street's advance information about the disbursements of General Motors have been usually fairly accurate, at least in the last year.

With car business running at record levels for this time of year, it is surprising that so many stocks have failed to advance or have displayed weakness. The explanation seems to be that the professional element has ceased to operate, at least temporarily, on the long side, and is unwilling to buy unless there is fairly definite assurance of early action by the companies for the benefit of stockholders. A slight tightening of credit conditions undoubtedly has had its effect.

The decline in Hudson, which brought the stock down to around 52 this week from a high last week of around 64, was evidently in anticipation of the earning statement just issued, covering the quarter ended Aug. 31 and showing lower net than for the same period a year ago. In view of the heavy expenses naturally to be expected as a result of the company's new production of all-steel bodies in its own factory this drop in earnings was not entirely unforeseen.

Mack Trucks was down without any apparent justification. Others in this group, including Yellow Truck & Coach and White also suffered, though in less degree. The accessory and tire stocks were mostly lower, and there was little market interest shown in them. The whole automotive and tire group, as a matter of fact, has been given less attention of late than at any period of the year, the outstanding exception being General Motors.

Cadillac Completes Building Program

New Administration Building Brings Total Floor Space to 2,460,713 Feet

DETROIT, Sept. 18—A $25,000,000 building and equipment program started in 1919 by the Cadillac Motor Car Co., was concluded yesterday with the completion of the new $600,000 administration building.

The final phase of the original program, begun two years ago and representing an outlay of $5,000,000, has included, besides the new office building, construction of a new foundry unit covering 7 acres of ground, a new assembly building 126 x 750 ft., and additions to distribution facilities.

The new administration building occupies a central position among other plant buildings. It has a frontage of 321 ft. and a depth of 56 ft. It is thoroughly fireproof, four stories high above basement, and provision is made for a fifth floor when needed. Architecturally, it conforms with the remainder of the plant. Exterior is of ornamental brick and Bedford limestone. Completion of the unit releases for manufacturing purposes 45,442 sq. ft. of floor space formerly occupied by the general offices.

A unique feature is a one-story garage which has been built directly to the rear. It is 60 ft. wide and 460 ft. long and will provide storage for officials' cars.

Interior finish is in keeping with the highest construction standards. The entrance is wainscoted 10 ft. high with French Tavernelli marble, with ceiling in decorative plaster paneling. The main staircase is done in Tennessee marble. Chief executive offices are in American walnut, with walls paneled 8 ft. high. Remaining offices are in fumed oak.

Various departmental offices have been arranged in a manner to provide the greatest efficiency. The first floor is given over to a reception room, showroom and purchasing department. The executive offices and sales department are located on the second floor. Additional executive offices, the planning and advertising departments and traffic division are located on the third floor while the cost department and general accounting division are situated on the fourth floor. A cafeteria, print shop and mailing room are located in the basement.

The Cadillac plant now comprises 2,460,713 sq. ft. of floor space, and while its great building program has been brought to a close, the company still has a large portion of its 45 acre site for future expansion.

Form Insurance Bureau

NEW YORK, Sept. 18—Organization of a bureau of automobile fire insurance companies who are not affiliated with the National Automobile Underwriters' Conference was agreed upon at a meeting of representatives of the independents held this week in the meeting room of the National Board. The plan adopted was suggested at a previous informal conference, and will be only slightly modified.

The new bureau will not formulate rates but will exchange moral hazard information, file data on stolen cars to aid recoveries and operate a bulletin information service with title laws, etc.

General Motors Has $250,000,000 Payroll

DETROIT, Sept. 18—The payroll of General Motors Corporation now exceeds a quarter billion dollars annually.

The figure, based on the wage rate being paid to more than 151,000 employees as a result of the consolidation of General Motors with Fisher Body Corp., will total $254,394,000 annually. The figure, incidentally, does not include the employees of certain affiliated companies nor the employees of dealers who are merchandising General Motors products.

The 29 major manufacturing operations of General Motors Corp. which is operated as a decentralized organization, have plants in 48 cities, 12 of which are in overseas countries. In many of these cities General Motors factories are the principal industry and place of employment of labor.

The corporation has 45,800 stockholders, residing in every state and there are 20,000 dealers in the United States selling cars manufactured by the corporation. General Motors purchases materials and supplies from 6000 concerns, with many thousands of employees, and many of these companies sell the bulk of their product to the corporation. The corporation also does business with 12,500 banks.

N. J. Rentors Organize

TRENTON, N. J., Sept. 18—Eighteen of the "self-drive" automobile companies of New Jersey have incorporated the New Jersey Rentors' Association for the purpose of combating more effectively the provisions of the compulsory liability insurance act passed by the last Legislature. The new company will fight the act in the higher courts and will maintain a lobby to work at the next session of the Legislature. An injunction has already been obtained in the Court of Chancery under which Commissioner of Motor Vehicles Dill is restrained from enforcing provisions of the act until a further hearing is held.

Greece Bars Passenger Cars

WASHINGTON, Sept. 18—Greece has placed embargoes on automobile chassis with or without motors and on automobile passenger car and bus bodies, with the power given to the Minister of Finance to exempt truck and bus chassis, a report to the Automotive Division, Department of Commerce, from Athens states. Greece has freed all public motor vehicles from license taxation during the present fiscal year.

Most Car Accidents in Local Territory

Better City Planning and Civic Pride Urged to Overcome Traffic Evils

NEW YORK, Sept 18—Only 6 per cent of motor vehicle accidents involved cars in interstate traffic, with 94 per cent occurring in the home state and 53 per cent in the town where the vehicle is owned, according to the monthly report of traffic planning and safety submitted by Alvan Macauley, a director of the National Automobile Chamber of Commerce to the board meeting of the N. A. C. C. The figures are based on reports of 37,000 motor vehicle accidents in the State of Connecticut. The figures also show that 18 per cent of the accidents happened to cars when they are being driven by friends of the owner.

Reports from all sections of the United States compiled from newspaper articles show that 29 cities, having more than 100,000 population, had fewer motor fatalities for the first seven months during this year than for the same period last year. The grand total of all available records indicates that the accidents for 1926 were a fraction of a per cent above 1925.

Mr. Macauley says that better city planning and stronger local pride are the chief means of improving motor traffic. The Connecticut report, he points out, is particularly significant in relation to the question of whether or not accidents are due to local or visiting cars, since Connecticut draws a large amount of tourist travel.

Calorimeter Builds Unit

EAST MOLINE, ILL., Sept. 18—The Standard Calorimeter Co. plans erection of a foundry in Moline for production of illium alloy, and, although the new plant is too rushed, the machine shop here will not be moved for some time. The calorimeter is a device to measure heat units in fuel. Upon a reorganization and incorporation of the company a year ago, W. S. Parr became president; O. J. Root, vice-president and H. L. Parr, treasurer and assistant manager. Because of the exacting nature of the work the company will maintain its own laboratory at the new Moline plant. The illium alloy is made principally of nickel and chromium and is used in the calorimeter and for the manufacture of acid pumps.

Chandler Makes Correction

As the result of a typographical error in the specifications received from the Chandler-Cleveland Motors Corp., it was stated in the Aug. 12 number of Automotive Industries that the cylinder dimensions of the Chandler Standard Six engine were 3 1/16 x 4½ in. The correct dimensions for this engine are 3 x 4¼ in.

Florida Air-Mail Extended to Atlanta

Line Reduces Mail Time to New York One Day—Stops at Six Cities

JACKSONVILLE, FLA., Sept. 20—Jacksonville this week was placed within three hours of Atlanta when the Florida Airways, Inc., inaugurated a mail and passenger service between these two points. The first trip was made from Atlanta to Jacksonville on Wednesday, Sept. 15, and will be a daily feature hereafter.

For several months this air concern has operated planes between Miami, Fort Myers, Tampa and Jacksonville, all Florida points, filling a mail contract with the government for this service. Major Reed M. Chambers, head of the organization, reported here recently that the line has proven successful despite the fact that air mail has been comparatively light.

On arrival of the first Jacksonville-Atlanta plane here Wednesday, a large crowd of city, State and government officials were present to extend a formal welcome. Postmaster Large, of Atlanta, was one of the passengers on the southern trip and Postmaster Ross returned with him to Atlanta. Capacity mail cargoes were carried both ways on the opening day.

Macon, Ga., will be added as a point of call as soon as a landing field has been completed there. Officials of the Georgia city announced this week that the field should be ready by Oct. 1. Extension of the air line will reduce mail time from Miami to New York 24 hours, according to officials. The new schedules are as follows:

Southbound: Leave Atlanta daily at 7 A. M.; Macon, 8.05 A. M.; Jacksonville, 11.10 A. M.; Tampa, 1.30 P. M.; Fort Myers, 3 P. M.; arriving at Miami, 4.15 P. M.

Northbound: Leave Miami at 7 A. M. daily; Fort Myers, 8.55 A. M.; Tampa, 10.25 A. M.; Jacksonville, 12.45 P. M.; Macon, 3.50 P. M.; arriving at Atlanta, 4.45 P. M. The distance of the route was increased to 683 miles by including Macon and Atlanta. Until the landing field at Macon has been completed the planes will fly direct between Jacksonville and Atlanta. A big three-engine Stinson-Detroiter is being used for the new run.

Ocean Shipping Rates Continued to January

NEW YORK, Sept. 20—A temporary adjustment of the ocean shipping contracts to European Continental ports has been arranged between the export traffic committee of the National Automobile Chamber of Commerce and the steamship companies.

These contracts expired August 31, and while the steamship lines have expressed dissatisfaction owing to many of the shipments being routed over outside lines by automobile dealers abroad, they have agreed to continue the rates until Jan. 1. In the meantime the N. A. C. C. committee is endeavoring to place the matter on a basis that will be entirely satisfactory to the steamship companies.

The N. A. C. C. committee has also announced an agreement with the lines operating to the East Coast of South America, whereby shipments of automobile parts will be granted the same freight rates as automobiles. Heretofore the parts have been charged 10 cents per cu. ft. higher than automobiles.

Argentine Studying Highway Possibilities

DETROIT, Sept. 18—Julio Fevre, of Buenos Aires, Dodge Brothers dealer in Argentine, who is making a tour of the United States, and who came here to meet executives of Dodge Brothers, Inc., sees much good coming out of the Congress for Good Roads, which met in Argentine, last year.

The Congress has produced a better feeling throughout the country for the need of better roads, he said, and the Government is now studying plans to build modern highways. There is a great necessity for main trunk roads to connect communities and to bind the land together, he said.

Mr. Fevre is the pioneer Dodge Brothers dealer in Argentine. He imported his first car in 1916 and has represented the company continuously since. He will be remembered as the dealer who built the giant replica of a Dodge Brothers truck. It was so large that it housed a special showing of the Dodge Brothers line in Buenos Aires, and attracted world-wide attention.

Foreign Dealers in Detroit

DETROIT, Sept. 18—T. A. Low of Auckland, New Zealand, Dodge Brothers dealer, was a recent visitor at the Dodge Brothers factory, at Detroit, where he contracted for his next year's supply of cars. Included in the order was an item for five all-steel Dodge Brothers sedans which will be used as taxicabs.

C. J. Neunhoffer, dealer in Melbourne, Australia, also was a visitor, recently, at the Dodge Brothers factory.

Egyptian Show Plans Here

WASHINGTON, Sept. 18—The Automotive Division, Department of Commerce, has available for distribution to the trade circulars which explain the general regulations, plans of the sites and buildings and other information concerning the first international motor show to be held in Egypt, Feb. 15 to March 15 next.

Chain Belt Adds Unit

MILWAUKEE, Sept. 20—Contracts have been awarded by the Chain Belt Co. for another unit of its manufacturing group here. The latest building will be 120 x 310 ft., one story high.

Minnesota to Seek More Highway Funds

Increased Gasoline Tax and Higher Car License Fees Under Consideration

MINNEAPOLIS, Sept. 20—Although some difference of opinion exists as to various points on which the Minnesota legislature will be asked to pass laws affecting the traffic and automobile tax rules of the state at the 1926-1927 legislature it is an assured fact that the legislators will be asked to advance the tax on gasoline, cut the registration on trucks from 10 per cent as compared with the passenger vehicle tax of 2.4 per cent, to have licenses based on a personal property valuation, to adjust depreciation in line with actual conditions, to establish reciprocal relations with neighboring states so that trucks in interstate business need carry only one set of license plates.

At recent meetings the Minnesota State Automobile Association opposed increase in the gas tax, but voted to ask the legislature to pass a driver license law with small fee and for revocation by court authority of licenses of drunken or reckless drivers.

The Minnesota Commercial Truck Owners Association would have the gasoline tax advanced from 2 to 4 cents per gallon if necessary to make up for any decrease that may follow changes in the basis of motor vehicle registration fees. The truck men say truck depreciation is 30 per cent a year. The present law permits of only 10 per cent reduction a year for seven years.

Commissioner C. M. Babcock of the highway department of the state will ask the legislature to increase the gasoline tax from 2 to 3 cents and that the motor vehicle tax be restored to the scale prevailing before it was reduced by the 1925 legislature. The revenue from both sources is now $15,000,000. A cent would add $2,500,000 to the gasoline revenue source. The commissioner will ask a $20,000,000 bond issue for road betterment. The restored license fee would mean minimum tax of $12 instead of $10 and 2.8 per cent tax on passenger cars instead of 2.4 per cent.

U. S. Has 9000 Associations

WASHINGTON, Sept. 18—Approximately 9000 organizations of a strictly commercial and industrial character exist in the United States at present, a compilation just issued by the Department of Commerce shows. The compilation lists the organizations alphabetically under their various classifications, giving the headquarters and, in most cases, the membership of each. It shows 1199 interstate, national and international organizations; 1131 state organizations and 6449 local organizations. Twenty-nine automotive and accessories organizations are listed.

Road Show Attracts Additional Exhibitors

WASHINGTON, Sept. 18—Applications for exhibition space at the Road Show and other indications point to even wider interest than during previous years in the annual convention of the American Road Builders' Association, to be held in Chicago during Good Roads Week, Jan. 10 to 14 next, according to officials of the association's national headquarters here.

Headquarters will be opened Dec. 10 by the association, at the New Palmer House, to take care of the pre-convention arrangements.

H. G. Shirley, president of the association and chairman of the Virginia Highway Commission, has arranged several new features for the program. These include a "Pan-American Day," at which delegates from North, Central and South American countries will hold the center of the stage with their exhibits and in various addresses. This day will be observed Jan. 12. Jan. 11 will be "Governor's Day" at which state executives from various parts of the country, particularly those identified with the good roads movement, will be special guests.

Provisions have been made to accommodate 2000 at the annual banquet of the convention.

Offer Highway Essay Prize

WASHINGTON, Sept. 22—For the purpose of stimulating interest in highway construction in the United States, in conjunction with the 1927 Convention and Road Show of the American Road Builders' Association, which meets in Chicago, Jan. 10 to 15, three prizes have been offered by the association to the engineer writing the best article describing a method, material, or equipment and its application to the economic construction, maintenance or operation of highways.

The first prize, as announced by the Washington office of the organization, is a free trip and all expenses to the Chicago convention; second prize $150, and third $75. Articles are to be sent to C. M. Upham, business director of the association, at Raleigh, N. C.

Coming Feature Issues of Chilton Class Journal Publications

Sept. 30—Automotive Industries. Annual Production Issue

Nov. 4—Motor World Wholesale. Annual Marketing Issue

Jan. 1—Automobile Trade Journal. Annual Show Issue

Jan. 6—Motor Age. Annual Show Issue

Chain Products Offers Special Sales Cabinet

CLEVELAND, Sept. 18—The Chain Products Co., manufacturers of Hodell tire chains, announces that it is now prepared to furnish a new device to automotive jobbers and service stations to facilitate tire chain sales and fitting. The device is a steel cabinet occupying but nine square feet of floor space. This contains chains in a continuous string and in six widths. The operator merely draws out the proper length for the tire to be fitted and cuts off the chain with a special cutting tool which also opens and closes connecting hooks. A rivet set that makes the attaching of fasteners a half-minute job and a specially designed anvil are also provided.

Celeron Capacity Expanded

PHILADELPHIA, Sept. 18—Diamond State Fibre Co. has in the last ten days increased the production capacity 33 per cent due to increase demand for Celeron silent timing gears. Pending orders for gears make it likely that further increases will be necessary by the first of 1927.

Welding Exposition Set for November

BUFFALO, Sept. 20—Arrangements have been completed for an international welding exposition in connection with the annual fall meeting of the American Welding Society which will be held here Nov. 17 to 19. The exposition will show the new developments in welding apparatus and supplies and a large variety of welded products.

The technical sessions of the meeting will include papers and discussions on "The Design and Development of Welding Apparatus," "Organization of Welding on the Railroads," "Welding of Locomotive Parts," "Welding Science in the Engineering Curriculum of Universities," and "Arc Welding in a Gaseous Atmosphere."

National Show Drawings to be Held October 7

NEW YORK, Sept. 18—Exhibition space at the New York and Chicago National Automobile Shows will be allotted at a drawing to be held in the New York offices of the National Automobile Chamber of Commerce on Oct. 7.

The drawing for space each year has become an annual get-together for the automobile industry, open to newspapermen, dealers designed by the factories and factory executives.

The show dates for 1927 are: New York, Jan. 8 to 15; Chicago, Jan 29 to Feb. 5.

Defer Schneider Cup Races

WASHINGTON, Sept. 22—The Schneider cup races, between Italian and American seaplanes, which had been scheduled for Oct. 24 at Hampton Roads, Va., have been postponed until Nov. 11 because of delay in delivery of material for the Italian machines. Navigability races, providing for navigability and rough water endurance, will be held Nov. 9.

Calendar of Coming Events

SHOWS

Boston, Mass. .....Sept. 27-Oct. 2
Radio Exposition, Mechanics' Bldg.
Brussels .....Dec. 4-15
Buenos Aires .....Dec. 7-20
Ninth Argentine Automobile Show, Palermo Park.
Cairo .....Feb. 15-March 15
First International Motor Show.
Chicago .....Sept. 27-Oct. 2
National Radio Exposition.
Chicago .....Nov. 8-13
Coliseum, Automotive Equipment Association.
Chicago .....Nov. 8-13
Accessory Exhibit, Armory.
Chicago .....Nov. 15-19
Hotel Sherman, National Standard Parts Association.
Chicago .....Jan. 10-15
Coliseum, American Road Builders' Association.
Chicago .....Jan. 29-Feb. 5
National, Coliseum, National Automobile Chamber of Commerce.
Chicago .....Jan. 29-Feb. 5
Annual Salon, Hotel Drake.
Cleveland .....Oct. 4-8
Public Auditorium and Annex, American Electric Railway Association.
London .....Oct. 4-9
Olympia Motor Cycle.
London .....Oct. 21-30
Los Angeles .....Feb. 12-19
Annual Salon, Hotel Biltmore.
New York .....Nov. 24-Dec. 4
Annual Salon, Hotel Commodore.
New York .....Jan. 8-15
National, Grand Central Palace, National Automobile Chamber of Commerce.
Paris .....Oct. 7-17
Auto Salon, Grand Palais.
Paris .....Dec. 3-19
International Aeronautic Exposition, Grand Palais.
Ponce, Porto Rico .....Dec. 1-12
Prague .....Sept. 18-28

CONVENTIONS

American Electric Railway Association, Public Auditorium and Annex, Cleveland .....Oct. 4-8
American Road Builders' Association, Congress Hotel, Chicago .....Jan. 10-15
Associated Manufacturers of Fabric Auto Equipment, Inc., La Salle Hotel, Chicago .....Nov. 13
Automotive Equipment Association, Coliseum, Chicago .....Nov. 8-13
National Association of Finance Companies, Chicago .....Nov. 15-16
National Standard Parts Association, Hotel Sherman, Chicago.....Nov. 15-19
National Tire Dealers Association, Inc., Memphis, Tenn. .....Nov. 16-18
Society of Automotive Engineers, National Transportation and Service, Boston .....Nov. 16-18

RACES

Atlantic City .....Sept. 25
Dallas, Texas .....Nov. 11
Laurel, Md. .....Oct. 23
Los Angeles .....Nov. 25
Salem, N. H. .....Oct. 13